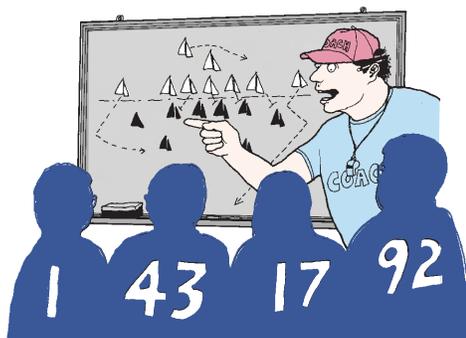




PLAYBOOK SERIES 5: Boatspeed

Issue #132

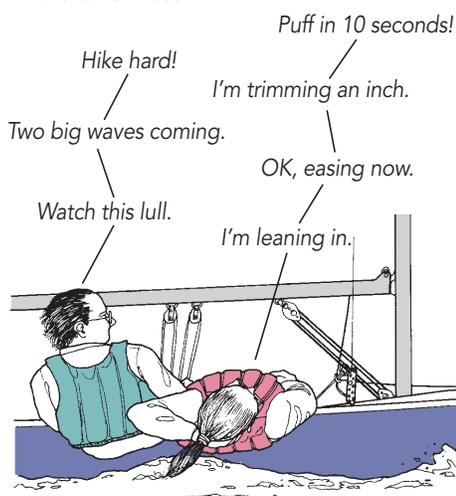


**PLAY 1: Never be content with your boatspeed!**

In many ways, driving a boat is much more complicated than driving a car. On the highway, you can accelerate to the speed limit and then simply put your car in cruise control for the rest of your trip. But in sailboat racing, that doesn't work.

The sailing environment is always changing, so good boatspeed requires a continuous flow of trim adjustments that are optimized for the wind and waves you have at any moment. If you get your boat going fast and then put it in cruise control, pretty soon you won't be going fast any more.

So never be content with speed. Always keep working to go faster by making adjustments for changes in the wind and water.



**Know the key principles of going fast**

There's nothing quite like good boatspeed to make you feel smart and help you get across the finish line ahead of your competition. It doesn't matter how good your strategic plan is – without speed you'll eventually be squeezed out the back of the pack like a slippery watermelon seed. And that's not much fun.

When you do have speed, it's much easier to follow your game plan, recover from mistakes (or bad luck!) and execute tactics. You can pinch off a boat to windward and gain the option to tack, for example. Or you can survive to windward of another boat's bad air long enough to get to the favored side of the course.

What all this means is that it's worth making a big effort to improve your boatspeed. This fifth part of our Playbook Series, with 49 'plays' to help you go faster, is part of that process.

It's obviously impossible to condense the entire science and art of boatspeed into 16 pages. So what's inside this issue are the key things you need to know about evaluating your speed, shifting gears, sail trim, steering, communication about speed, finding the 'groove,' and more.



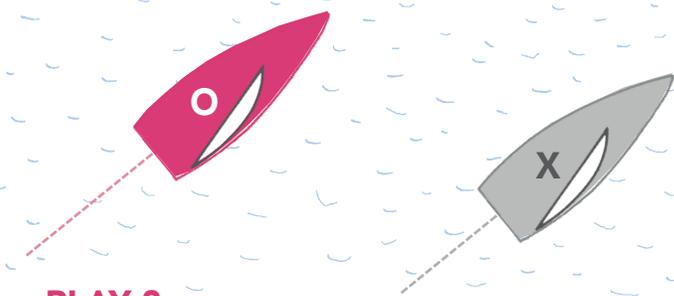
JH Peterson photo

Every race-course situation teaches a unique set of lessons about boatspeed. This blue Flying Scot, for example, is trying to hold a lane of clear air above the white boat. If she wants to keep going this way, she should shift into 'point mode' to avoid bad air. It looks like the crew might be able to sail the boat a little flatter, but this depends on how much windward helm the skipper feels. The crew is communicating with each other, which is good. There should probably be a set of telltales in the middle of the jib luff, and it looks like there is a twist in the mainsheet, which would make the sheet slightly harder to adjust.

## Follow these basic rules of thumb for consistent speed.

Going fast is certainly one of the best ways to win races. Fortunately, the science of boatspeed is not as mysterious nor as technical as many people think. Good boatspeed can be achieved by any sailor, regardless of his or her level of experience. And the best part is you don't have to understand very much about sailing theory in order to go fast. You just need a good sense of feel, patience, determination and some keen observational skills.

It also helps to follow a few boatspeed rules of thumb, especially if the pursuit of speed ever begins to feel perplexing. The principles described on these two pages (and in the rest of this issue) are helpful guides that almost always apply to speed situations.



### PLAY 2: Use other boats to help you get faster.

It is very difficult to improve your boatspeed very much by working alone. Of course, there are some things you can do by yourself in areas such as boat preparation, sail shape and boathandling. But any serious racing campaign knows that in order to make substantial progress on speed development you need to line up with two boats side by side.

In almost all kinds of sailboat racing, the only way to truly judge your boat's upwind or downwind performance is by comparing it to the performance of a similar boat. In other words, boatspeed is relative. Though many boats now have quite accurate ways of measuring their speed through the water, even the most sensitive instruments cannot distinguish the subtle differences in speed and pointing that are so critical in sailboat racing. The only way to measure these is by gauging how you compare to another boat sailing nearby in the same conditions.

So when you are trying to get up to speed at the beginning of the season, or before any regatta or individual race, try to include another boat in your plan. Ideally this should be another boat exactly like yours, but if you race handicap you can pick any boat that's similar. It would be perfect if you and your tuning partner can find one or more training days to carry out a systematic test of various sail-trim settings through a range of different wind conditions. However, even a three-minute lineup before the start of a race will be extremely helpful.

### PLAY 3: Be proactive, not reactive.

A basic tenet of sailboat racing, like many other sports and activities, is that you will generally be better off initiating change rather than simply reacting to events. This certainly applies when you are trying to improve boatspeed.

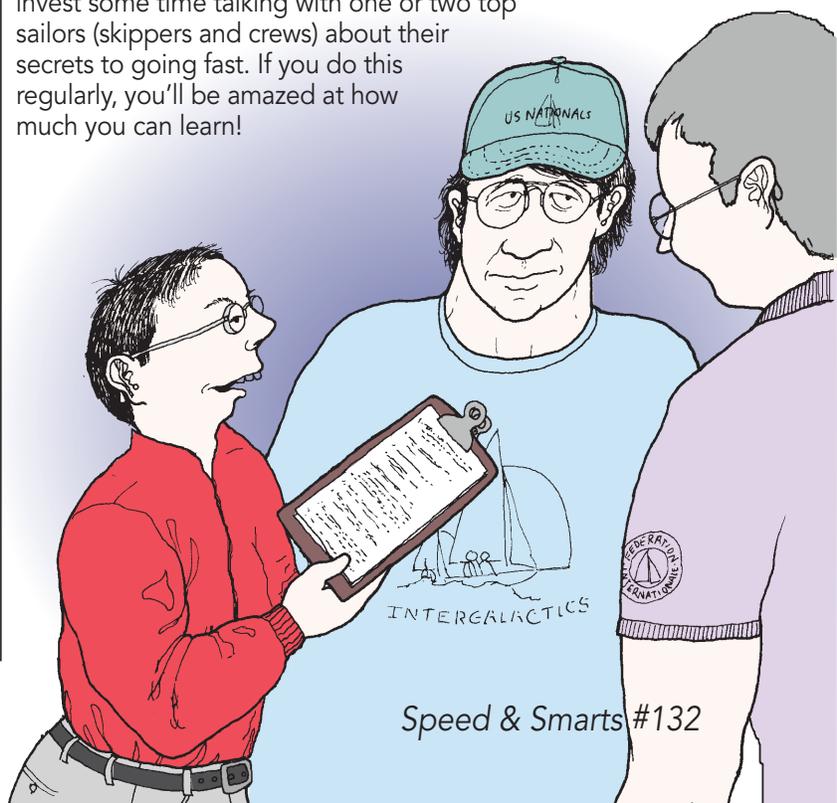
A perfect example is what happens when you're sailing upwind and you get hit by a puff. If you wait until you feel the boat start to heel over before you do anything about it, you will be 'reacting' to that puff. The problem is that some of the energy from the puff goes into pushing the sailplan sideways (i.e. making the boat heel) rather than driving the boat forward. This does not help your speed.

A better way to handle the puff is to be proactive. Just before you get the puff, pull on a little backstay, drop the traveler a bit and hike really hard. Now when the puff hits your sails you won't be overpowered – most of the puff's energy will push the boat ahead rather than sideways. This idea of being proactive applies to all aspects of boatspeed.

### PLAY 4: Don't 'reinvent the wheel.'

When you're trying to improve your speed, don't start from scratch. There's a lot of information already available about how to go fast in almost any boat. For one-designs, the best source of information is usually a sailmaker's tuning guide (from your own sailmaker or another). Many of these are now online, which means they are easy to get, and they're updated often. I strongly recommend setting your boat up exactly like your sailmaker recommends. Once you feel fast and comfortable with this set-up (which could take years), you can try experimenting if you want.

Other people in your class or fleet can also be excellent resources on boatspeed. Most sailors love to be considered experts, and they are usually very willing to share what they know (especially if it helps grow the fleet). All you have to do is ask! After each day of racing, make it your policy to invest some time talking with one or two top sailors (skippers and crews) about their secrets to going fast. If you do this regularly, you'll be amazed at how much you can learn!



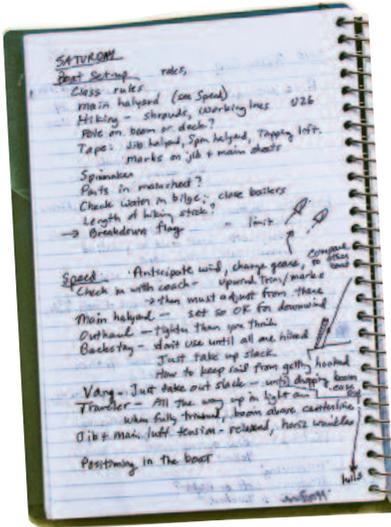
**PLAY 5: Keep a good record of notes about speed.**

Good boatspeed is about consistency as much as anything else. Of course, almost any sailor would welcome a flash of super speed, even if it's short-lived. But that's not what your goal should be. If you really want to improve your speed (and therefore your race results) for the long run, you must have a systematic approach to learning everything about making your boat go fast.

In grand prix auto racing, does each team's head mechanic keep a history of engine settings for every car? Of course! They'd be foolish to begin a race without a very good record of what has (and hasn't) worked in the past.

The same is true for sailboat racing, another technical sport where speed is super important. How many sailors keep a record of the tuning set-up and sail trim settings that they have found to be fastest over a wide range of wind conditions? A lot of top competitors have this, but I'm guessing many others do not.

There are several ways to keep track of accumulating speed information. My preference in the past has been a handwritten notebook (left), but now it's usually easier to keep all speed notes in some sort of electronic notebook. This could be a text or Word file in a phone or tablet, or a document file online that all crewmembers can access, contribute to and study. The important thing is simply having a system where it's very easy to record, organize, add to and review your speed notes.



A page of speed notes from my Olympic match racing notebook.

Chris Howell - J/70 Class



**PLAY 6: Make (and pursue) a plan for going fast.**

Good boatspeed does not usually happen by chance or accident. Once in a while even slow boats have moments when they find 'the groove.' But whenever you see a boat that is consistently fast, this is usually the result of a concerted and methodical effort by her crew.

Improving boatspeed is a longer-range project that requires patience, persistence and practice. In order to be fast you must be smooth at sail trim, boathandling, changing gears, steering and much more. Some of these skills can be developed in a short time by yourself, but others require more time and, ideally, a cooperative training partner.

The good news is that any sailor can learn to be fast. Of course, it helps if you have resources like time and money. But even then, the most important thing is making a plan for how you can develop better speed. Approach this with the same attitude, organization and enthusiasm that you would use to tackle any other challenge in your life, and the results will be rewarding.

**SPEED & Smarts**

**PLAYBOOK #5**



**Boatspeed**

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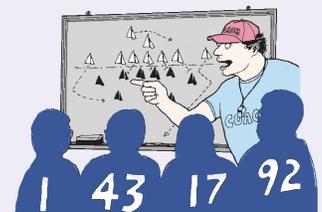
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## Check up on your speed.

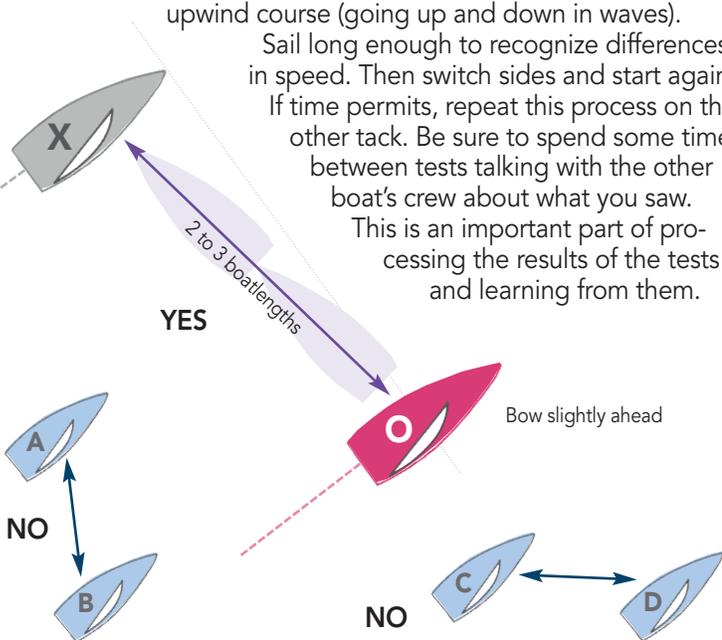
In sailboat racing, speed is relative. It doesn't really matter what your knotmeter says or how fast your boat feels – the only true measure of performance is how well you are going compared to the boats around you. Your boat's performance upwind (and downwind) is a subtle combination of speed and height (pointing) that you can evaluate only when sailing near another boat that is in the same wind you are. Therefore, keep a close eye on nearby boats to see how your speed compares. Try to do this often because if you're not going very fast you need to know as soon as possible so you can make a change. As they say in other areas of life, awareness is the first step to improvement. Here are some ideas on how an accurate evaluation of your performance can lead to better speed.

### PLAY 7: When two-boat testing, set the boats up properly for a good speed test.

Take advantage of any chance you get to sail upwind next to another boat! This could happen on a practice day or during a regatta in between races. When you have a willing partner, use the time you have efficiently so you learn as much as possible.

The key to successful two-boat testing is starting with the boats in the proper position. In most cases you want them about 2 or 3 boatlengths apart, with the leeward boat anywhere from bow-even to one boatlength ahead. This position is critical for keeping the boats close enough so they are in the same breeze, but at the same time it allows each boat to sail her normal fast upwind course (going up and down in waves).

Sail long enough to recognize differences in speed. Then switch sides and start again. If time permits, repeat this process on the other tack. Be sure to spend some time between tests talking with the other boat's crew about what you saw. This is an important part of processing the results of the tests and learning from them.



Don't waste time sailing in bad lineups! If the windward boat (A) gets her bow too far ahead (left), the leeward boat won't have the option to sail in high mode. If the leeward boat (D) gets her bow too far ahead (right), the windward boat won't be able to sail in foot mode. As soon as you realize that a lineup has gone bad, stop and restart in the proper position.

### PLAY 8: Determine whether you are gaining or losing on other boats.

When it comes to boatspeed, the most important thing to know at any moment is how your speed compares to other, similar boats around you. In other words, are you relatively faster, the same speed or slower than boats that are sailing in the same wind?

This is critical to know because the answer forms the basis for most of the trim adjustments you will make. If you are going fast and therefore happy with your speed, you probably won't need to make many changes to your set-up (unless you have a change in wind or waves). But if you are slow, you may want to try a number of different things to get going faster. The difference between these two approaches is always based on your assessment of relative speed.

When you are judging speed, try to answer this basic question: If the boats keep sailing as they are now, which one will get to the windward (or leeward) mark first? Your goal is to assess: 1) Which boat has better upwind VMG; 2) How different are the boats' VMGs (Is one boat a lot slower or just a little slower?); 3) How are the boats gaining and losing (Is the gainer pointing higher, going faster through the water, or both?); and 4) Why are they gaining or losing (Is it all due to speed or partly wind-related? See Play 10). This information will help you make proper adjustments to your sail trim settings.



The farther you are from other boats, the more likely it is that performance differences (between you and them) are due to strategic factors such as wind and current. So use caution when trying to compare your speed with a boat far away.



**PLAY 9: Do not evaluate your performance using instruments!**

If you are lucky enough to have instruments on your boat, these can provide a lot of good information to help you sail faster. A boatspeed display (above), for example, is very useful for seeing which way your speed is trending, and this helps you know when to shift gears up or down. This display is also valuable for keeping you in the ballpark of your 'target speed' (see Play 15).

However, boatspeed instruments are useless for assessing your overall speed. Performance depends on many variables such as subtle changes in wind velocity and pointing angle – neither of which is measured by this instrument. Even though displays like this show your speed to the hundredth of a knot, they cannot measure the small differences between boats sailing to maximize VMG upwind or downwind. So do not use them to evaluate speed!

**PLAY 11: Identify the speed and height combo that applies between you and another boat.**

When one member of your crew is reporting on your performance compared to nearby boats (see Play 34), he or she should talk about speed and height (pointing). Both of these are integral parts of your upwind VMG, and either one by itself is not very helpful.

If you hear only that a boat to windward of you (in the exact same breeze) is pointing higher, for example, should you change gears into point mode? Not necessarily. It depends on how the other boat is performing overall. Will she beat you to the windward mark? Or is she losing so much speed by pinching that you have a better VMG? Obviously you also need to know her speed through the water. If she is higher and faster than you, or even higher and the same speed, she is gaining and you may want to make changes.

Comparing your performance	NET
'Same height and speed.'	=
'Same height and faster.'	+
'Same height and slower.'	-
'Higher and same speed.'	+
'Higher and faster!'	+
'Higher and slower.'	?
'Lower and same speed.'	-
'Lower and faster.'	?
'Lower and slower.'	-

With two variables (height, speed) and three options for each (faster, same or slower), there are nine possible ways to describe the relationship between you and another boat (chart). In seven of these it is clear whether you are gaining or losing; in the other two (see ?), the speed reporter must give his or her opinion about which boat has a better VMG.

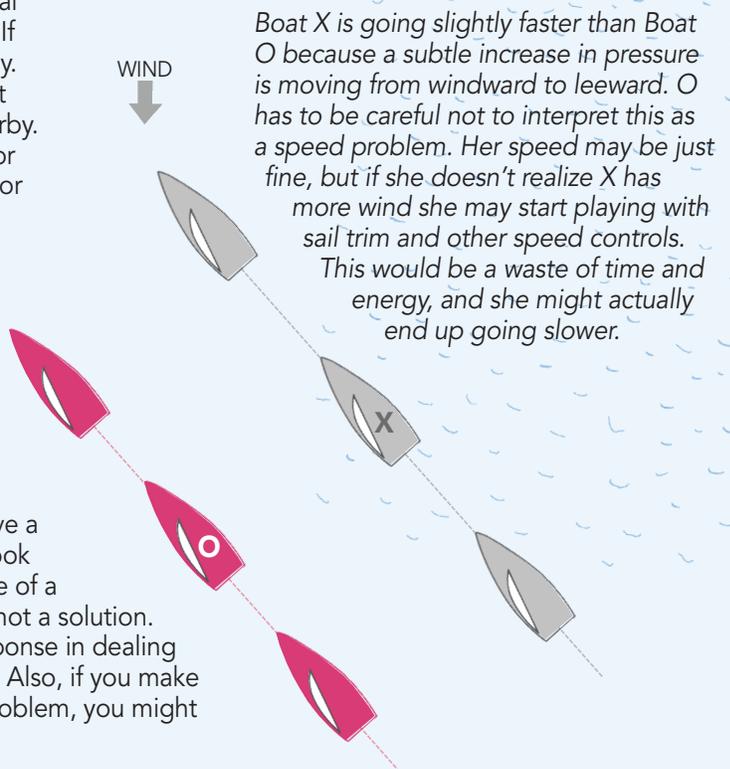
**PLAY 10: Figure out why there are performance differences between boats.**

When you are training or racing near another boat, it's critical to recognize whether one of the boats is faster (see Play 8). If there is a speed difference, the next step is to figure out why.

There are several possible explanations for why one boat may be going faster or slower than similar boats sailing nearby. The most obvious reason is that the boat going faster and/or higher is doing a better job of trimming their hull and sails for the existing conditions. If the slow boat is overt-sheeting their sails, heeling too much or trying to point too high, for example, that could easily explain a speed difference between boats.

However, variations in performance may have nothing to do with boatspeed. Maybe the faster boat has a bit more wind pressure, or they are slightly lifted. Maybe the slower boat has a clump of seaweed on her rudder or a momentary lapse in concentration.

When you are working on a 'boatspeed problem,' try to identify the real reason for its existence. Do you actually have a case of the 'slows,' or is there another explanation? If you look slower simply because the boat to windward is on the inside of a gradual lift, for example, changing your sail trim settings is not a solution. That would be a waste of energy and would delay your response in dealing with the real problem (your position on the outside of a lift). Also, if you make sail trim adjustments in search of a solution to a strategic problem, you might end up with a boatspeed problem after all.



## Sail fast by finding the ‘sweet spot.’

Like most athletes, the best sailors don’t usually over-think what to do. When their boat feels slow, they fiddle around a bit, make a few adjustments and quickly get back into a groove. The ‘groove’ is a somewhat-elusive state in sailing when a boat feels good and achieves near-optimal performance upwind or downwind. It’s like the ‘zone’ that a basketball player enters when the basket looks three feet wide, or the feeling that a baseball batter gets when the pitcher seems to be throwing at half speed. For sailors, it’s clear that being ‘in the groove’ is very fast and being out of the groove can be quite slow. Here are a number of ideas about how you can get into the groove more often.



JH Peterson photo

### PLAY 12: Tune in to your sense of feel.

The key to achieving top performance is knowing how your boat feels when it’s going fast, and then being able to reproduce that feeling in subsequent races. Whenever you are practicing or racing with another boat and you’re going well relative to that competitor, pay attention to ‘feel’ factors. For example, how much windward helm do you have? What is the boat’s angle of heel? How much pressure is in the mainsheet? What does the boat feel like as it hits each wave? Take a mental snapshot of these feelings and store them in your memory (or notebook) so it’s easier to recognize them in future races.

When the boat feels good, it usually means you are going relatively fast, but it’s hard to describe exactly what makes a boat ‘feel good.’ Perhaps the most important thing is the ease with which you can keep the boat sailing ‘in the groove’ for extended periods of time. If the boat seems to ‘sail itself’ without a lot of work on your part, this is a positive sign. It feels good because things are balanced, the boat doesn’t slow down easily, and hopefully you have better height and speed than nearby boats.

### PLAY 13: If it feels good, do it.

The ‘feel’ of your boat (helm, sheets, etc.) is a good guide to its performance. So if a change in trim makes your boat feel better, it was probably a good idea, and you should consider doing more of it.

Imagine that you are steering upwind, holding the hiking stick in one hand and the mainsheet in your other. The boat feels pretty good, so you try trimming the mainsheet another inch or two (which should improve your pointing).

Now you wait a moment to see (or, to feel) what happens. Does the boat seem more lively and powerful (e.g. did it power up and accelerate)? Or does it feel more dull and mushy? If the boat seems to slow down, you probably trimmed the sheet too much, so ease it back out and get the boat going again. If trimming the sheet feels good, however, then you might try trimming even a little harder. Let the feel of the boat be your guide.

### PLAY 14:

#### Practice with your eyes shut.

Since the feel of your boat tells you so much about its performance, it’s crucial to develop this sense in training as much as possible. One way to do this is by sailing your boat upwind with your eyes closed or wearing a blindfold. There are so many visual stimuli in a sailboat, and these distractions make it very difficult to focus on other senses. By turning off your eyesight, you will feel the boat much more easily. See if you can notice changes in boatspeed and subtle differences in angle of heel. The best way to do this is by describing your sensations to a partner who gives you instant feedback (and keeps you from crashing into anything!).



### PLAY 15: Use a ‘target speed’ to stay in the ballpark.

If you have a boatspeed readout you can use the concept of target speed to help you find the boat’s sweet spot upwind or downwind. Every boat has a theoretical optimal speed for achieving maximum VMG in each wind velocity. Some boats (such as the one shown here), have target (polar) speeds built in to their onboard computer. The idea is to match your actual upwind speed to the boat’s displayed target (6.91 here in the wind velocity at this moment). If you do this, you are theoretically sailing your boat at optimal VMG.

If you don’t have a target speed display, just guess (based on time spent sailing upwind) at a target speed you think will give you the best performance relative to other boats. Aim at this target for a while and see how it works. If you are lower and faster than other boats, make the target slower; if you are higher and slower, make the target faster. Then use the new target as a guide.

## PLAY 16: When you have trouble finding the groove, make the groove easier to find.

When sailing upwind, it's fast if you can keep your boat sailing 'in the groove' for as much of the race as possible. But this is not easy, especially when you have challenging conditions such as shifty winds, puffs and lulls, or more waves than wind.

When the wind is steady (in both velocity and direction) and the water is flat, it's fairly easy to find a 'groove' and keep your boat there. But as soon as conditions change (e.g. you get hit by a wave or puff), it's easy to fall out of that groove.

That's why in variable conditions it's fast to set up your boat so it has a relatively wide groove. A wide groove is a compromise – it doesn't allow you to achieve the highest level of performance, but it makes the boat more forgiving and easier to steer fast, even if you make a mistake. As a result, your average, long-term performance is often better than if you tried to sail at top-end speed. Here are some things you can do to widen the groove:

### Ease the mainsheet and/or jibsheet.

Tight sheets lead to more easily stalled sails; in tricky conditions, err on the side of going a little too fast rather than too slow.

### Make your sails fuller overall.

Flat sails are good for pointing but more likely to stall.

### Allow your sails to have more twist.

Twistier sails are more forgiving because the wind will stay attached to some part of the sail even in waves, puffs, lulls or shifts.

### Sail the boat slightly lower and faster.

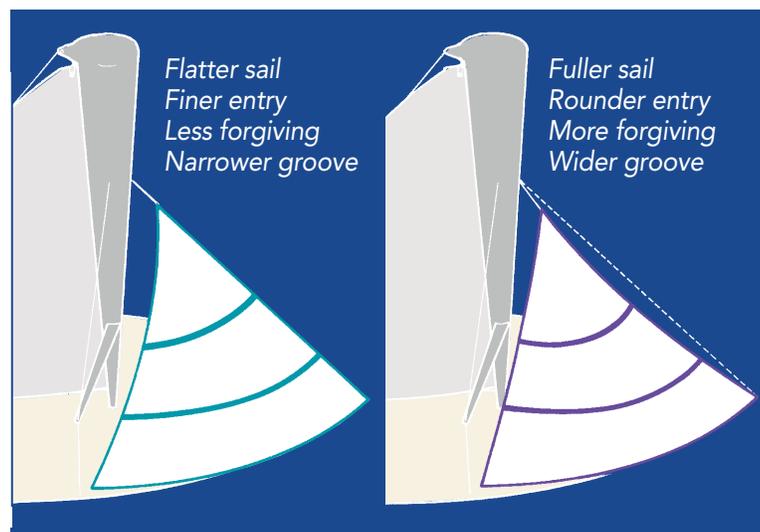
When it's easy to get slow, a little extra speed is your friend.

### Allow the boat to heel a little more.

A bit more leeward heel increases windward helm – this extra feel makes it a little easier to steer within the groove.

### Make the front of the jib rounder.

More shape in the luff allows the wind to attach to the sail more consistently and makes steering easier.



The jib set-up on the left will point well and perform at a high level, but it's tricky to keep in the groove. The sail on the right may give up some performance but it's much easier to keep in the groove, so it may actually perform better overall.



## PLAY 17: Focus on the angle of heel.

Some sailors believe that a boat's heel angle is the single most important clue when they're trying to optimize performance upwind or downwind. The amount of heel tells you a lot about power in the sailplan and the amount of windward helm. Most boats are fast when they're pretty flat; of course there are exceptions to this such as in very light air.

The best way to see your boat's heel angle is by looking at the relationship between your headstay and the horizon. If your boat is perfectly flat, this angle will be roughly 90°. The farther it is from 90°, the more heel you have.

Besides knowing the existing heel angle, it's key to know the current trend. Is the boat about to heel more or less? You can gauge this by feeling the pressure of the hull as it pushes up against your body or drops away from you. This gives you a good idea of whether the boat is gaining or losing power and helps you make the needed trim adjustments.

## PLAY 18: Copy the fast boats.

Your competitors are a great source of go-fast ideas, so keep an eye on them. There is no rule that says you can't copy what other sailors are doing. In fact, there's a rule of thumb that says you should.

Pay particular attention to boats near the front of the fleet that are going faster than you. These boats are probably sailing 'in the groove' a relatively high percentage of the time, so don't be afraid to study their set-up. During every race they are sailing around the course showing you how to go fast. This is valuable information – and it's free! All you need to do is be a good observer.

When sailing near a boat that seems faster, ask your crew to look at them carefully and describe what is different about their set-up. For example, are they trimming their mainsheet harder than you are? Is their crew weight in a different place than yours? Can you see if their jib lead is in the same position?

If you can identify certain trim differences between boats, try those settings on your boat. If this makes it easier to find and stay in the groove, you will probably be faster as a result.

## Fine-tune the shape of your sails.

Sails are the sole power plant for racing sailboats, so trimming them correctly is critical for good speed. This is not always easy, though, because most boats have many tools for stretching each sail into thousands of subtle shapes. The goal of a sail trimmer, therefore, is to find the sailshape that is fastest in the conditions that exist at any moment. Here are a bunch of ideas on how to do that.

### PLAY 19: If the boat feels good, trim harder.

Going fast upwind means you must find the best compromise between speed and pointing. You can bear off and go fast, but you won't make much progress upwind. Or you can point high by pinching, but you'll go pretty slow.

Good helmspersons are constantly trying to find the combination that gives them the best upwind VMG. Typically they use the mainsheet like a throttle. If the boat feels fast, they trim the sheet harder and go for more height. If the boat feels slow, they ease the sheet for acceleration.

Here's how you can use this trimming cycle: When your boat feels good (i.e. it's easy to steer and you're going fast through the water), trim the mainsheet harder and point the bow slightly higher. If the boat still feels good, repeat this process. Once the boat slows down or no longer feels so good, ease the sheet a little and bear off to accelerate. When you're going fast again, repeat this process in a never-ending cycle.

### PLAY 20: In puffy wind, set up for the lulls.

When the wind velocity is up and down, it's difficult to set your sails correctly for all the different velocities you will see (and it's impractical to adjust every control each time you get a change in velocity). If your sails are full enough for the lulls, you'll be slow in the puffs; if they're flat enough for the puffs you will struggle in the lulls.

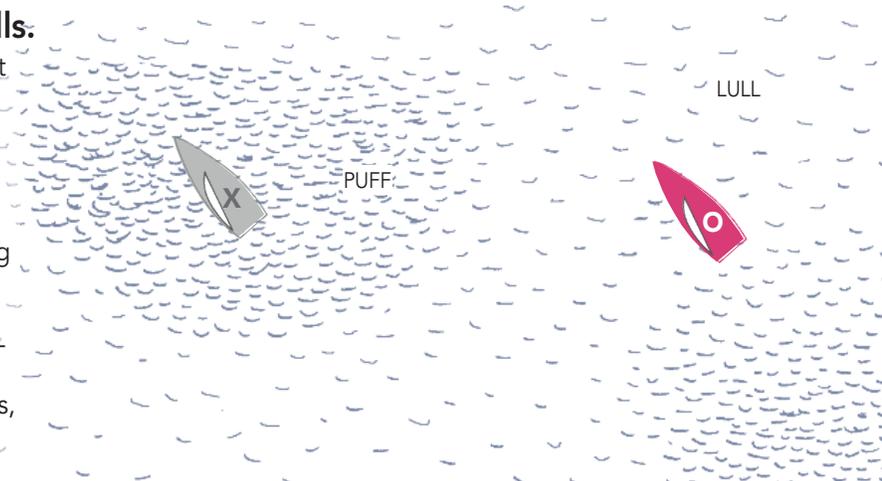
The best solution is usually to err on the side of setting up for the lulls. That's because when you get a puff it is relatively easy to go fast. If you're overpowered, that is a good problem to have, and you can live with it temporarily. But in the lulls you need lots of power; if you don't have it you will struggle to keep up with your competitors, and it will take you even longer to reach the next puff.



JH Peterson photo

### PLAY 21: Don't cleat the sheet!

The wind is always changing, so you must constantly adjust sail trim to keep the boat going fast. That's why you should try not to cleat your mainsheet! The mainsheet allows you to feel the boat's pulse and should be your number one method of shifting gears (which is necessary almost all the time). Cleating the line is OK if you're going on a picnic, but once you put it in a cleat, it's easy to forget about it. Of course, in windier conditions and bigger boats you may not be strong enough physically to hold the sheet – in that case you have to cleat it, but mentally pretend you are still holding it.

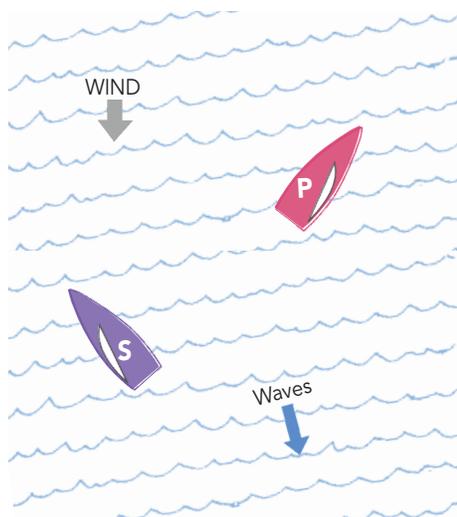


### PLAY 22: Trim your sheet so the top batten is parallel to the centerline.

Getting the right amount of twist in the mainsail leech is critical for speed and pointing in all conditions. If you overtrim the main (too little twist), it will stall and be slow. If you undertrim the main (too much twist), you'll be faster but your height will suffer. The key is finding a happy compromise that gives you the best of both worlds.

A good rule of thumb in most conditions is to trim the mainsheet so the top batten is parallel with the boom; i.e. you want that batten pointing straight aft.

In light air and chop, ease the sheet so the main twists and the batten angles to leeward a bit. You may also need this batten angle to depower in big breeze. In flat water and moderate wind (ideal pointing conditions), trim the sheet harder so the top batten angles to windward (and the telltale at the end of that batten stalls at least 50% of the time).



### PLAY 23: Consider trimming sails differently on each tack.

In most races you should trim your sails identically from tack to tack, but don't assume this is always the fastest way to go. Certain conditions require different trim settings (e.g. twist and depth) on each tack, so consider this adjustment when you think it makes sense. The two most common situations are when the waves are not aligned with the wind (see below) and when you have wind shear (a change in the direction of the wind as you go aloft).

◀ One condition that requires different sail trim from tack to tack is when the waves aren't lined up with the wind. Look for asymmetric waves when you have:

- Geographic effects – such as a point of land that waves bend around
- Recent windshift – any shift will cause a temporary asymmetry in the waves
- Cross-current – current at an angle to the wind will create asymmetric waves

In this diagram, the waves are coming from 20° to the left of the wind. As a result, boats on starboard tack sail almost directly into the waves while boats on port tack have a smoother ride. Going fast requires different sail trim for each.

### PLAY 24: Use reference marks to calibrate sail controls.

If you want to improve your boatspeed, you must be able to do two things: 1) identify the tuning and sail trim settings that are fast in each wind condition; and 2) be able to reproduce these fast settings from race to race and regatta to regatta. You won't make much progress if you are fast one week but slow the next because you forgot how your boat was set up.

This concept of **reproducibility** is a key building block for better speed. In order to find fast settings again in the future, you need to quantify them. This means putting marks and measuring scales all over your sail controls (see photo). Basically, you want to give everything a number and then keep track of the numbers that give you good speed in various conditions.

For most boats, you can add reference marks with a few basic tools such as a tape measure (for rake, jib lead position, mast butt location, etc.), a tension gauge (for rig tension), and a magic marker with tape (for calibrating your backstay, outhaul, jib halyard, cunningham and so on).

Place a mark on each of your key controls and create a number scale alongside that mark. Ideally this mark and scale should be in a place where the helmsperson and trimmers can see them while you're racing. Also, set up your measuring systems so the higher numbers mean more tension on every control. In other words, a 7 means you have more cunningham, a flatter outhaul and a tighter jib halyard than a 6.

Whenever you feel like your boat is 'in the groove,' look at all the corresponding trim settings. Record these numbers in a chart in your 'speed notebook' (see Play 5) for future reference. Before your next regatta, review your notebook and start by setting your controls at the numbers that were fast for similar conditions in the past.

**It's easy to add reference marks to almost any sail control by using a marker right on the deck or on a piece of tape stuck to the deck.**



JH Peterson photo



Chris Howell - J70 Class

### PLAY 25: Trim with a curl.

When trimming a spinnaker, it's fast to get the sail out in front of the boat as much as possible so the power of the chute pulls the boat forward. It is slow to overtrim the sheet for two reasons: First, the wind is more likely to stall on the back of the sail. And second, more of the force generated by the chute will pull the boat sideways rather than forward.

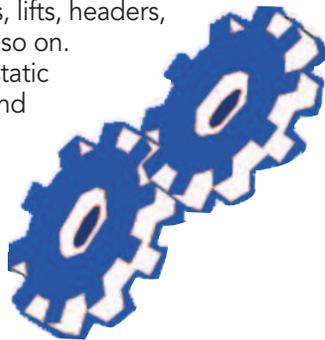
To be sure the chute rotates forward as far as possible, continually ease the sheet until you have a slight curl along the luff of the spinnaker (see red chute above). Though this means you give up a small amount of folded-over sail area, it's usually much faster to have the sail eased all the way with a small curl than to get rid of the curl but risk having the sail overtrimmed some of the time (which might be the case with the blue chute).

## Don't hesitate to adjust trim.

Sailboat racing is a challenge because conditions are always changing. You can't just trim in your sails, cleat them and expect to win races. As Olympic champion Buddy Melges often says, you must 'present your boat for Mother Nature.' In other words, you have to anticipate the puffs, lulls, shifts and waves that are coming. And when these reach your boat, you should have already made adjustments for them (rather than reacting after they hit you). Sailors often refer to this process as 'changing gears' since it is similar to the routine you must follow when driving a manual shift car through traffic and hilly terrain.

### PLAY 26: Change gears constantly.

When you're driving, you have to shift gears whenever you stop, start, turn, accelerate onto highways, go up hills, etc. But you also travel for long stretches where you don't need to shift gears at all. In sailboat racing, change is usually continuous. You have puffs, lulls, lifts, headers, bad air, waves, tacks, turns and so on. Very seldom are conditions so static that you can set your boat up and sail very long without changing something. In fact, you should assume that constant change is the normal environment. Therefore, to keep going fast you must continually adjust the trim of your boat and sails.



### PLAY 27: When changing gears, understand all your options.

One good way to improve your boatspeed is by increasing the percentage of time that you spend sailing in the right 'gear.' For simplicity, think of a sailboat, like a car, as having four gears that cover the range of upwind sailing. First gear is used for accelerating from a slow speed while fourth gear is used for going full speed and pointing. Unlike a car, however, a boat's transmission is a continuum of various trim settings from first through fourth gears.

There are actual two categories of ways to shift gears. The first includes changes that you make on shore or before a race based on the predicted wind and sea conditions. These are things you don't worry about while racing because it's illegal to change them then or impractical to do so. This list includes items like raking the mast, moving the mast butt, changing rig tension and choosing a headsail.

The second category includes all the adjustments (to the trim of your boat and sails) that you can make while racing to take advantage of changes in the wind and seas. These are things that you (or your crew) can do fairly easily and quickly. However, you don't usually have time to make all the changes you desire when faced with a puff or wave. Therefore, you must prioritize possible adjustments, and focus on those variables that will have the biggest impact.

Typically, the first changes you should make are almost always to your sheets (main and jib), the backstay (if you have one) and the position of your crew weight. If the change in your sailing environment is sustained, then you should consider secondary adjustments such as the traveler, outhaul, cunningham, jib luff tension and so on.



J.H. Peterson photo

### PLAY 28: Keep a good lookout to windward and ahead.

In order to anticipate changes that are coming in the wind and waves (so you can shift gears before they get to you), every crewmember should keep at least part of his or her attention outside the boat. The most critical place to look is anywhere from roughly 10° to 40° off your windward bow because that's where most of the changes you will get are coming from.

The puffs and lulls that will affect you are approaching from the direction of your apparent wind. Look up at the wind pennant on top of your mast (or at the telltales on your shrouds) and follow this direction onto the water ahead. The wind ripples you see there are the puffs and lulls that will come to you in the near future.

The waves you will get are also in this general direction. However, since waves travel more slowly than wind, the waves that will hit you are actually closer to your bow (forward of your apparent wind direction). Look there to anticipate the waves and flat spots you will get.

It's good for all crewmembers to keep an eye on what's coming, but make sure at least one crewmember has specific responsibility for calling out loudly the changes that are imminent and may affect boatspeed.



JH Peterson photo

### PLAY 29: Shift gears before you feel changes in the wind or waves.

The idea with shifting gears is to be proactive, not reactive. Anticipate upcoming changes in the wind or waves and make your corresponding adjustments just before the changes hit. When you approach a bigger-than-average wave (above), for example, try to 'downshift' before it hits. The goal is to have your sails all powered up by the time your bow punches into the wave – otherwise you will lose a lot of speed and it will take you too long to recover.

The same is true for changes in wind velocity. When you see a puff coming, shift to a higher gear just before it hits. If you don't react until after you feel the boat start to heel, you will lose power. That is, some of the force of the puff will be used to heel the boat over rather than propel it forward.

The key here is anticipation, so keep a good lookout and communicate with your crew about what's coming. In a small lightweight dinghy, you may need only one second to shift gears before a change in the wind or waves. But in a heavy keelboat this might take you five seconds or even longer!

### PLAY 30: If you're slow, change something.

During a race, it's important to have a continual sense of your boatspeed relative to the rest of the fleet. When you're going fast, it's good to know this so you can a) identify the sail trim settings that are working, and b) avoid changing things unless you have a good reason.

When you're going slow, you definitely want to figure this out as soon as possible. The longer you spend sailing slower or lower (or both!), the farther you will fall behind. Once you've identified a speed problem, change something. Start by adjusting things that have the biggest impact on your boatspeed. My first change is almost always to ease (or tighten) the mainsheet. If this doesn't help, change other variables (e.g. jib sheet, backstay or crew position) that also have a large effect on speed. You'll learn more if you change only one thing at a time and wait long enough to see its effect. This is a good approach in training, but you may not have the time to be so patient in racing.

### PLAY 31: Go fast first, then try pointing.

The ability to point high is great for tactics, strategy and speed, but you can't just aim your boat closer to the wind. When pointing is a problem, the natural response is simply to turn the boat a little more toward the wind, but this is the opposite of what's needed. Pointing ability is closely tied to speed, so in order to point higher you must usually start by pointing lower. This gets the water flowing faster over your foils, which increases their efficiency and produces lift (of course, you may also need to make other tuning or trim changes to improve pointing.)

Pointing high in a sailboat is like driving a car in fourth gear – you can't just shift straight into the highest gear or you will stall. You have to get there by building speed in first, second and third gears. Then if the boat is going fast and feels good, try shifting into point mode by making the sails a little flatter, trimming harder and aiming a bit higher.

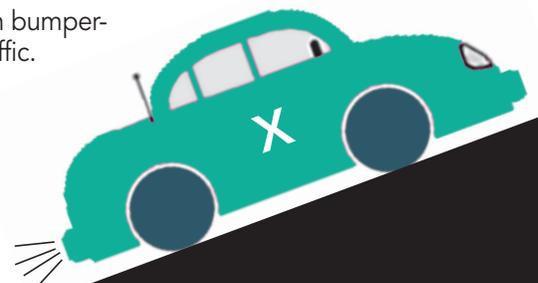
### PLAY 32: Focus on shifting 'down.'

It's usually easier to shift up when you are driving downhill than to shift down while driving uphill, and the same is true about sailing. When you get hit by a puff, it's fairly easy to go fast, even if you don't shift gears perfectly. But when you hit waves or sail into a lull, it's very difficult to keep the boat going fast. That's why it is critical to be able to downshift.

The ability to accelerate is critical for racing success because boats often slow down during the course of a race. This happens whenever you tack, hit waves, approach the start and almost all the time in lighter air. When you get slow and need speed, there are many things you can do:

- **Anticipate the need to downshift.** If you are late shifting up in a puff, it's not the end of the world because you will go faster no matter what you do. But getting a lull is not the same, so make sure you are powered up beforehand.
- **Bear off a little.** It's difficult to accelerate while sailing your normal closehauled angle, especially if you are in disturbed air or water. So bear off a bit and 'press' on your jib until the windward telltales fly straight back.
- **Ease your sheets.** The worst thing is to have your sails trimmed in tight when you are underpowered. A tight sail is likely to stall, so let the sails out to help build speed.
- **Make your sails fuller.** Deeper sails are more powerful and help you accelerate from slow speed like the wings on a plane that is taking off. You can increase depth quickly by easing backstay, mainsheet, cunningham and outhaul.

When conditions are changing, make sure you shift gears promptly. You may need to be in and out of acceleration mode (first gear) continually – just as you would have to be when driving a car in bumper-to-bumper traffic.



## Run silent, finish deep!

When it comes to improving boatspeed, good communication is key. Imagine a boat where no one was allowed to talk. What a disadvantage that would be! If you want to make your boat go as fast as possible, you need contributions from everyone on your team, not just the helmsperson and trimmers. Each crewmember brings a unique skill set and point of view to the team, so encourage everyone to speak up loudly and clearly.

It could be possible to have a team that talks too much, and that might be distracting. But that is the exception rather than the rule. On most boats there is too little communication, either because people are afraid to speak up or because they're not sure what to say. On this page and the next are a bunch of great suggestions about how all crewmembers can speak up and help their boat go faster.

### PLAY 33:

#### Talk about how the boat feels!

As we discussed previously, the feel of your boat is a key component of sailing fast. Therefore, it's important for everyone on your boat to get involved in the 'sailing by feel' process. Since just one crewmember is holding the tiller or jib sheet, the only way for other teammates to know how the tiller or jib sheet feels is with detailed and constant communication. Here are some examples of what the trimmers or driver might say about feel:

"I have too much helm."

"The pressure in the chute is dropping."

"The boat feels too flat."

"We're building speed slowly."

When I'm driving, I like to have people say what they are feeling even when they think it may be obvious to the rest of the crew. Usually it isn't obvious, and verbalizing the feeling makes everyone more aware of what is happening (and more comfortable about contributing).



The helmsperson can tell a lot about the pulse of the boat through the feel of the tiller or wheel. But he or she can't keep this a secret! Tell the rest of the crew so they can do what's needed to sail the boat fast.



### PLAY 34: Assign one crewmember to report on your speed relative to other boats.

When you're trying to go fast, the most important information to have is how your speed and height compare to nearby boats. This is so critical that it's worth assigning one person to do this specific job (and nothing else if possible).

The task of the 'speed reporter' is to communicate your relative performance continually to everyone on the boat. The helmsperson needs this info so he or she can decide to go for height or speed; the trimmers need it so they know if they should be easing or trimming. The reporter needs to speak loudly so everyone can hear him or her above the noise of wind and waves. Here's a sample of what he or she might say:

"We're a little higher, same speed."

"Still a bit higher, maybe faster."

"Same height now, same speed."

"Slightly lower, but speed is at least the same."

"A little lower, and now a bit faster."

"Still lower and faster, net gain to us."

"Almost the same height, a lot faster."

"Same height, still faster."

"Higher and faster."

"A lot higher, now the same speed."

Each of these statements communicates information to the crew that can be invaluable for changing gears and going fast.

*Photo above: On a boat with at least several crewmembers, the bow (forward) person often calls waves and wind because he or she is in the best position to see what's coming. The 'speed reporter' usually sits farther aft so he or she can see boats to leeward (around the jib leech) as well as to windward.*

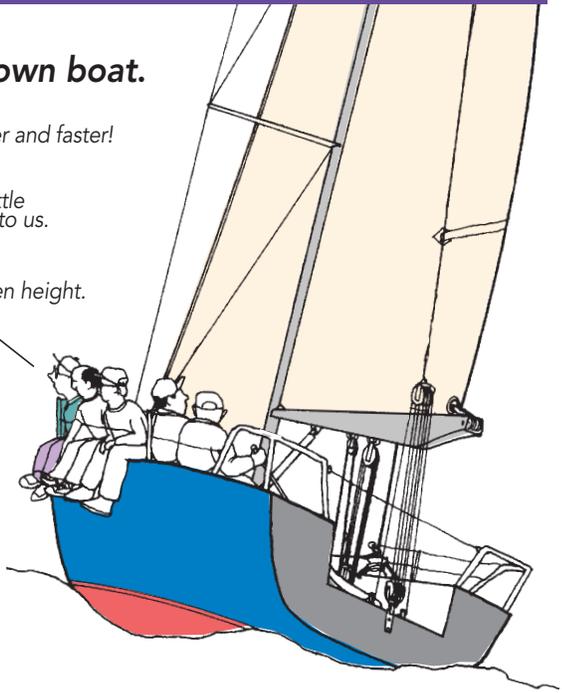
**PLAY 35: When reporting on speed, talk about your own boat.**

This is one of my pet peeves. I really like having a 'speed reporter' who lets the crew know how we are going relative to nearby boats. But I don't like when it's unclear whether that person is talking about our boat or the other boat. Here's how a discussion might go:

SR: "Higher and same speed."  
 Me: "That's surprising. Are you talking about us?"  
 SR: "No, I meant the other boat."

This kind of distracting conversation should never take place. Just tell your speed reporter that he or she should *always* talk only about *your* boat. That way you know everything he or she says is describing your own boat; there is much less confusion and no need for anyone to ask clarifying questions.

We're higher and faster!  
 Higher and a little slower - net gain to us.  
 Faster and even height.



**PLAY 36: Communicate about sail trim.**

One of the most important ingredients of good boatspeed is proper sail trim, so the helmsperson and trimmers should communicate a lot about this (especially as conditions change and there is a need to shift gears). Here is a sample of some things that are commonly discussed:

(jib trimmer) "I still have an inch of sheet to trim."  
 (chute trimmer) "I'm squaring the guy back a little."  
 (jib trimmer) "I'm trimming to the course you're steering."  
 (forward crew) "I'm ready to ease the vang if needed."  
 (helmsperson) "Drop the traveler to give me less helm."

**PLAY 37: Ask questions!**

Communication is a two-way street, so don't just wait for a teammate to give you the information you need to help the boat go fast - ask him or her! Here are some speed-related questions you might want to ask various crewmembers:

(to the helmsperson) "How much helm do you have?"  
 (to the jib trimmer) "Do you want any more jib halyard?"  
 (to anyone) "What's our target speed?"  
 (to the helmsperson) "Where do you want my weight?"  
 (to the speed reporter) "How are we going now?"  
 (to the forward crew) "How long until that puff hits us?"

**PLAY 39: Warn your team about pending changes in the wind and waves.**

In order to anticipate changes in the sailing environment (so the entire crew can shift gears efficiently), it's key to have one crewmember calling out puffs, lulls, waves and flat spots that are coming toward the boat (don't forget lulls and flat spots!). I usually assign this job to the crewmember who sits farthest forward upwind (see page 12 photo) because he or she has the best view of what's ahead (and he or she often blocks the view of other crew). The main requirements for this job are to yell loud enough for everyone to hear and early enough so everyone can make trim adjustments *before* the change arrives. Here are some things he or she might say:

"Puff coming in 5 - 4 - 3 - 2 - 1!"  
 "Three big waves in a row - here's the first one!"  
 "We're gradually sailing into less pressure."  
 "A very big flat spot in three boatlengths."  
 "Looks like we'll be headed in about 20 seconds."

**PLAY 38: Keep a good lookout, especially in the helmsperson's 'blind' spots.**

The entire crew can help sail the boat fast by keeping their heads out of the boat. Watch for puffs, lulls, waves, flat spots, shifts, converging boats, wind shadows and so on. Tell your team what you see and don't assume that this has been seen by everyone (or anyone) else.

Pay special attention to those areas where the helmsperson has a hard time seeing. The two primary 'blind spots' are behind his or her back and behind the genoa or jib. By focusing on these areas you will help avoid last-second surprises that could hurt your speed and gameplan.

Blind spot - to leeward and behind the jib



Blind spot - to windward and behind helmsperson

## Keep your speed while turning.

In most conditions, it's fairly easy to go fast in a straight line, but what separates the top sailors from the rest is the ability to maintain a higher percentage of their speed through turns and maneuvers. In actuality, sailboats don't sail in straight lines very much because they're always turning around waves or adjusting to windshifts. If you can gain as little as one inch every time you turn the rudder more than a few degrees off centerline, you will gain boatlengths by the time you reach the finish.

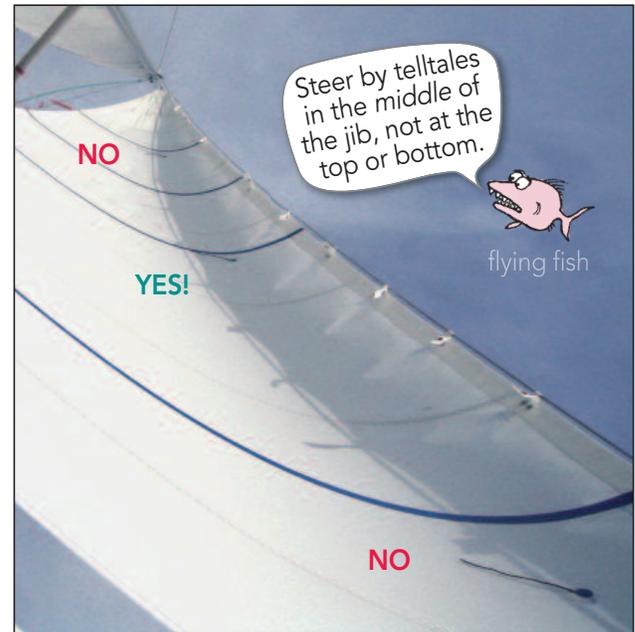
### PLAY 40: Don't maneuver without speed.

Any time you make a maneuver (e.g. a tack, jibe, spinnaker set, takedown, duck behind a starboard tacker) you lose distance to every other boat in the fleet. So don't tack or jibe unless you must and try to lose as little speed as possible when you do.

A good rule of thumb is to avoid maneuvers unless you have at least full speed, or ideally a little extra. If you're slow at the beginning of a tack or jibe, you'll be very slow at the end, and that will make it harder to accelerate to normal speed.

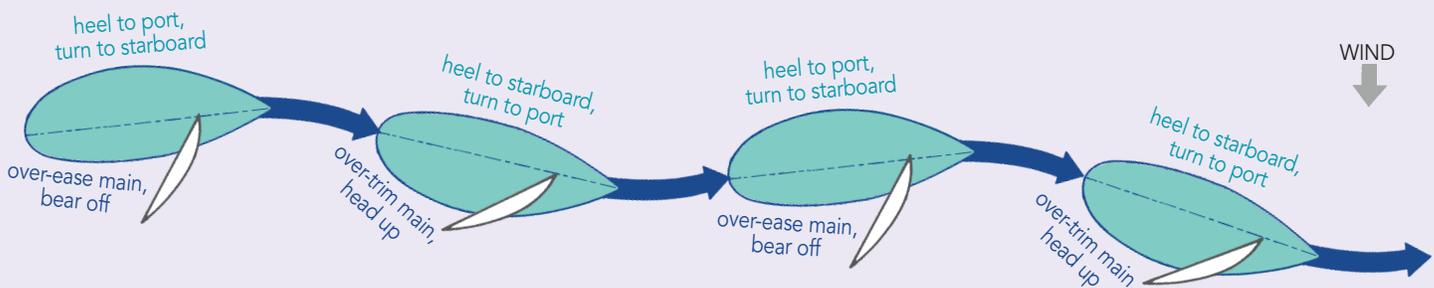
There are several ways to get enough speed for successful maneuvers. If you have a choice about where to make your turn, wait until you are in good wind pressure. Never make a maneuver in a lull unless you have a very good reason. If you're jibing in breeze, wait until you are surfing fast down a wave.

When you have to make a maneuver in a certain place (e.g. you need to tack into a lee-bow position on a starboard tacker), build speed by bearing off slightly as you approach the turn. In most cases the extra speed you have during the maneuver will more than make up for the ground you lose by bearing off.



### PLAY 41: Use your middle telltales.

When watching your jib luff telltales as a guide for steering upwind, use the telltales that are half way up the sail. Don't use the lower telltales simply because they are easier to see. Slide forward and to windward so you can see farther up the sail (add a new set of telltales there if necessary). This will be worth it because the middle telltales give you the best average reading for the entire sail (if you use the lower telltales you may sail with the entire top of the jib undertrimmed).



### PLAY 42: Always use weight to help turn.

When you want to go fast, the best strategy is simply to sail in a straight line. Turning a boat is slow, but unfortunately you can't sail around a crowded race course without turning a lot, so try to make every change of course with a minimal loss of speed.

We all know it's slow to angle the rudder off centerline because that creates drag. So try to turn as much as possible without using the rudder. Before moving your tiller or wheel to turn the boat, use the placement of crew weight to steer by changing the boat's heel angle. If you want to turn left, move your weight to the right so you heel the boat to starboard. When you want to turn right, move left. This is most effective in lighter air and with smaller boats, but it will help somewhat in all boats and any condition.

### PLAY 43: Always use sail trim for turning.

Turning the rudder always makes you slower, so whenever you need to turn your boat adjust sail trim to help as much as possible. When you wish to head up, trim your mainsail tighter (so the wind pushes your stern to leeward) and ease your jib a little (to allow your bow to head up more easily toward the wind). When you need to bear off, ease your mainsheet (so there is less pressure pushing your stern to leeward) and over-trim your jib slightly (to help pull the bow down). This technique is especially important in heavy air when turning the rudder and moving crew weight are less effective. If you've ever tried to bear off behind a starboard tacker without easing your mainsheet, you know that sail trim has a huge impact on where the boat goes.

## PLAY 44: Keep track of how much helm you have.

One of the most critical speed factors on any boat is the amount of windward (or leeward) helm you have when sailing upwind or downwind. The tug of the wheel or tiller tells you a lot about how the boat and sails are trimmed.

It's relatively easy for the helmsperson to keep track of helm because he or she can feel how much the tiller or wheel is pulling. He or she should communicate this to the rest of the crew, especially when there may be too much or too little helm.

The amount of helm has a large effect on sail trim, so it's key for the trimmers to be aware of this. On a boat with a tiller, they can easily give a glance aft to see the angle of the tiller off centerline (which equals the rudder angle). With a wheel, however, it's a little more difficult. That's when it helps to have a bright mark showing when the wheel is centered (see photo).



When the piece of white tape on this spoke (red circle) is at the top of the wheel, the rudder is centered. This boat currently has about 'one spoke' of windward helm. An obvious mark like this makes it easy for the entire crew to see how much helm the boat has at any particular moment.

## PLAY 45: Minimize rudder movement.

Steering a sailboat involves an ongoing series of turns. Even though most of these turns are relatively small, almost all of them require moving the rudder to one side or the other. As most sailors know, whenever you position the rudder at an angle to the centerline of the boat you create drag.

Therefore, the first rule of thumb for steering fast is to *minimize steering*. Reduce rudder movement and its associated drag by aiming the boat straight as much as possible. This is true for most boats over a wide range of wind and wave conditions. Many helmspeople have a nervous habit of oversteering, which is slow – it's usually better to hold the wheel or tiller very still.

Of course, you can't avoid turning the rudder altogether. There are many times in every race when the benefit of turning the rudder outweighs the extra drag you create. However, whenever you need to steer the boat, try to do this with as little rudder angle as possible by using sail trim and weight placement.



JH Peterson photo

## PLAY 46: Sail fast with the right amount of helm.

When sailing upwind, it's good to have about 3° to 5° of windward helm for optimizing performance. This amount of rudder angle helps create lift and gives the helmsperson a positive feel.

On a run or reach, however, an off-center rudder simply creates drag, and this is slow. Therefore, adjust your crew weight and sails to keep your rudder centered and your helm neutral as much as possible. Ideally, you'd like the boat to basically steer itself in a straight line downwind.

In light air most boats don't have enough windward helm upwind. This makes it hard for the helmsperson to feel the boat and find the groove. You may need to add more helm by raking your mast aft, moving weight forward, increasing heel, making the sails fuller and/or pulling the boom closer to (or even above) centerline.

When it's windy, on the other hand, many boats have too much windward helm (more than 5-7°). This makes steering tough and causes too much drag. Decrease helm by raking the mast forward, flattening the sails (especially the mainsail), decreasing heel angle (pinching is one way to do this), moving crew weight aft and/or dropping the traveler farther to leeward.

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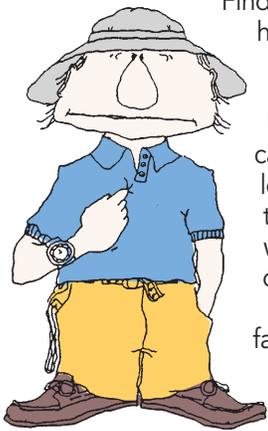
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## PLAYBOOK: *Boatspeed*

## Miscellaneous

### PLAY 47: Improve yourself, improve speed.



Finding better boatspeed usually doesn't happen overnight, so be persistent and commit yourself to the longer-term process of learning how to go faster. My philosophy has always been that you can't win every race, but you can always learn something from each race. I call this the 'no-lose approach,' and it works as well for improving speed as it does for other parts of sailboat racing.

Once you start figuring out how to go fast in certain specific conditions, you will develop the tools to repeat this process in any wind and water condition. This is key because every race you sail in the future will require a unique speed setup. So be patient and value the journey as you learn more about how to go faster.

### PLAY 48: Slow down to win.

Full speed ahead is almost always a good thing. Going fast usually gets you to the finish line sooner and helps you beat more boats. There are, however, a few times when you might actually want to slow down a bit. These include the following :

- **When it's very windy** – Sailboat racing is all about managing risk, and this is certainly important in big breeze. Sometimes it's better to throttle back and be conservative. This reduces your chance of having a breakdown, capsize or broach and thereby increases your chances of doing well in the race.

- **Strategic situations** – Sailing your best VMG course is not always the fastest way to get to the windward mark. If there's a puff on your windward side, for example, you may get it sooner by sailing high and slow. The benefits of getting into this puff could easily outweigh the cost of sailing slow temporarily.

- **Tactical maneuvers** – Sometimes when you are near other boats you have to go slow before you can go fast. A good example is when you are being 'pushed' toward the wrong side of the beat. Instead of blindly going fast, it's often better to slow down briefly so you can tack (to pass behind the boats that are pinning you) and go the other way.

In cases like these, faster isn't always better – going slow for a short time can actually help you get to the finish line sooner.



JH Peterson photo

### PLAY 49: Hike hard, but pace yourself.

On almost any boat, moving crew weight farther outboard when you're sailing upwind in breeze will almost always produce better speed. So work on finding the most effective ways to hike on your boat, and encourage your crew to be in good shape.

Even the most athletic sailors can't hike all the way out for an entire race, however, so save your best hiking for when it makes the most difference. Use two hiking modes: 1) 'flat-out' style where everyone hikes as hard as they can (as in the photo above); and 2) 'comfort' style, a position you could hold all the way up the beat. Use 'flat-out' mode at crucial times when you need speed, like right after the start or when you're close with other boats. Use 'comfort' mode at other times to conserve energy and strength.