

Spinnaker Work on a Racing Sailboat and some Sailing Theory

Victor Jean Ouellette, September 3, 2010 Version 1-2

We had a discussion on the boat the other night and it seems that we need to review some basic communication skills on our races. What boat doesn't might be asked here, LOL. What I will do is describe the foredeck jobs with regard to spinnaker work and try to describe the foredeck thinking processes too concentrating on the downwind leg of a race. I am doing this from memory so if someone feels they need to correct something then by all means do it please. The reason for this email is to help newer members understand what we are doing a little better. You will see from these eight pages that there is a lot to remember.

No one expects those people learning sailboat racing to remember it all. It is very difficult for someone who does know pretty much all of it, to explain it to a beginner as it is happening. It is not reasonable to expect an experienced foredeck crew to explain all the thinking ahead moves. There is just too much. There are too many variables.

The Spinnaker

The spinnaker as we all know by now, is a large sail that acts like a scoop to catch the wind when the boat is sailing downwind. Spinnakers are cut in different ways. By that I mean they are shaped by the sailmaker in different ways. There are running spinnakers and reaching spinnakers. On Force there are two running spinnakers, one faster than the other. The fast one would be the one with the blue starboard tape. The other spinnaker with the green starboard tape is kept as a spare.

Flying the Spinnaker

Some boats have light wind sheets that are much smaller and so weigh much less than regular sheets thus, allowing the spinnaker to ride higher in the wind in light air. The question comes up "Who should call the positions of things with regard to the spinnaker?" That job should rightfully go to the person flying the spinnaker (chute). Most boats have one person who flies it on both sides of the boat. On Force, the tradition is for the cockpit crew on each side of the boat to fly it on the side they are on. This is the FORCE tradition so that is what we have. The chute is a nickname for the spinnaker, by the way. The person holding the sheet that is attached to the clew is the one flying the chute. The clew is the end of the chute that is not attached to the mast or the spinnaker pole. The person flying the chute should position themselves on the high side of the boat and up near the mast so they can see the angle the pole makes to the wind. We will discuss that angle later. It is their job to get somewhere on the boat where they can see the whole luff of the spinnaker AND judge the pole angles at the same time. The only time they would move would be to get a better view of the sail or if the skipper calls for weight to be moved aft. Recall that a spinnaker pushes the bow down into the water and so the weight of the crew is moved aft to compensate and keep the boat level.

The spinnaker should be flown as high as possible on the mast and the spinnaker pole should be parallel to the water, not the deck of the boat. This sail is flown square to the wind and the water, not the boat. So, how do we know what is "the highest possible" and "why must it be flown as

high as possible"? Two good questions.

We tell how high the spinnaker must go by looking at the clew. The clew is the end that is attached to a sheet, but is not attached to the pole. The wind blows that end up and away from the water. If one were to raise the pole on the mast and the wind keeps the clew up then the pole should be raised again until the clew does not go up anymore. Most experienced crew get to know their boat and so, know just how high to put it in whatever wind is blowing at the time. Now in puffy wind, sometimes a compromise is made. The wind may drop and the clew falls then it may pick up again and it rises. Communication between the crew members is always good. We don't keep cranking the pole up and down on the mast, so a compromise is made in puffy weather.

Why should the chute be flown high? Lets address that issue. A spinnaker is shaped as a scoop. It is a triangle with the foot, (usually the white tape) designed to be parallel to the water. The other two sides go up to the top of the mast. However, these sides can be located at different distances from each other when flying in different winds. As a little drill, take a square piece of paper and fold it diagonally. The 90 degree point is the head at the top of the mast. A real spinnaker is NOT shaped like this, but this will serve to show what happens in real life on a boat. Now hold this paper by the two acute angles, one in each hand with the other point at the top. Bring your hands together a bit and bend the paper away from you. There is your spinnaker. When you raise the pole on the mast you put slack into the tapes, the edges that run up to the head. When you put that slack in that one tape that the pole is hooked to, then the wind blows that whole edge out to the side and away from the other edge of the chute, which in our spinnakers is coloured red. That process of raising the pole on the mast is called opening the shoulders of the chute so the sail catches more wind.

When the chute catches more wind the boat goes faster. The idea is to make the boat go faster so the running spinnaker should be flown as high as possible on the mast, as high as the clew will let it go. Raising the pole on the mast is like separating your hands with this piece of paper you just folded. If you put your eye level with the bottom of your piece of paper and close one eye, then separate and close your hands over and over then you will see how the paper gets bigger in front of your eyes as you separate your hands (akin to raising the pole on the mast). If you put your thumbs touching one another you can see how small the paper is as the wind blows directly from your eyes. This opening of the spinnaker shoulders makes a big difference in sailboat racing.

Whenever you see a boat with the spinnaker pole cocked way up on its outboard end, then you know they are sailing slow because someone did not raise the pole on the mast to match the wind. That low pole on the mast is pulling the tape edge going to the top of the mast, very tight and that tightness brings it closer to the other tape on the other side thus, closing the shoulders.

In very heavy winds closing the shoulders spills wind and so may be good provided the boat really is overpowered. And, I will add however here in that a boat might be overpowered in a certain wind for an inexperienced crew but not for an experienced crew. That is because an experienced crew reacts faster, troubleshoots smoother, avoids fixes, and gets out of fixes quicker than an inexperienced crew. It is up to the skipper to make the call on this one, as to when to power down and spill wind.

Dead Running (directly down wind), is a slow way to sail. So we reach off on a bit of an angle. To go at that angle, we go faster, but then have to go through more water than another boat that goes directly down wind. Usually reaching downwind gets you to the mark sooner. When reaching, one wants the chute out in front of the boat as much as possible, not off to the side of the boat. The reason is so the pull of the sail is not wasted in going sideways, but rather pulls the boat forward. So sometimes a compromise is made in the position of the pole to the wind. We will talk about that other pole position in a second. If one sails too far out at that angle though, then too much water has to be made up and you loose. It takes years to learn just how much to go out and EVERY experienced skipper makes the occasional mistake of going too far. That is just a fact of life in sailboat racing so should never be held against a skipper.

It is generally better to jibe several times down the middle of the downwind leg than to go off to the extreme end of the layline. Jibing downwind only loses one boat length per jibe, while tacking into the wind loses three boat lengths per tack on the up wind legs. And another thing, it is the boat that jibes not a sail, but crew often talk about jibing as though we are jibing the sail when technically we are not doing that.

The spinnaker should always stay 90 degrees to the wind and the boat jibes underneath the sail. The jibe needs to be timed and coordinated with the skipper and the two people on the spinnaker sail. When the boat turns dead downwind, that is the best time to make the pole transfer to the other side of the boat. Then after that the skipper can come up to the reaching course that he/she thinks is best. That should all happen pretty quickly. Sometimes jibing the pole early behind the main so it is easy to get on can help when the skipper wants to come up onto a hard reach very soon, but that requires an experienced crew.

The pole angle to the wind.

The boat goes the fastest when the chute can catch the most wind. The chute should be kept with the pole 90 degrees to the wind and parallel to the water. If you look at a competing boat and the pole is cocked up at a 20 degree angle from the deck and is 20 degrees toward the bow from the wind direction then that boat will go slow. It is just simple physics. Its all about angles. When the pole is parallel to the water then it is pushing the sail out as far as the pole can possible push it, and thus, catching the most wind. This is especially important in light air.

The spinnaker has essentially two luffs on each side, an upper luffing part and a lower luffing part nearer the bottom of the sail by the pole. The luff of the spinnaker is the side edge attached to the pole. The person flying the spinnaker is supposed to keep the luff always on the edge of curling in. The part the flyer looks at is the upper luff. Having a little curl in of that upper luff does NOT slow the boat. If you get too much luff then the chute collapses in and the boat can slow to a near stop. If the pole is brought back too far away from the bow then the LOWER luff may luff. On smaller boats a single person would fly both sides at the same time and they get very good at setting the pole very quickly. If the lower luff curls in it is not so good and the correction is for the person on the sheet attached to the pole to let the pole go forward toward the bow a bit because it generally means the pole is back too far and not 90 degrees to the wind.

Now some sailors who fly the spinnaker are very touchy about their job and they want total

control of the chute. They do not want the person on the pole letting it go forward or back, or anywhere else, unless they call it. Force is pretty easy going about this so there is not too much worry.

Reaching

When the boat reaches on the down wind leg then sometimes some compromises are made. If the reach is approaching a beam reach then sometimes the pole is lowered on the mast to stretch the sail more and try to make it sail like a Genoa. That generally does not work well unless the spinnaker is cut for reaching. People learn things over their years of experience and they learn how their stretched sails work better with little tweaks that vary from the ideal.

Puffs

When a puff hits a boat that is reaching the skipper will bear off and head down to the mark on a track that is less of a reach as the boat speeds up in the puff. As the wind dies off the skipper will head up onto more of a reach again to gain speed again or to maintain the speed. The skipper has to focus on multiple things all at the same time and it is frustrating for them when they have to pull away from their mental gymnastics to focus on some boat crew issue. It is the skipper who has the legal responsibility for all the crew and also wants the crew to have fun, but skippers depend on the crew to know their jobs.

Heavy winds

When the winds become heavy then a high riding spinnaker will start to oscillate from one side of the boat to the other making the boat heel one way then the other. That is very dangerous because an accidental jibe of the mainsail can hurt crew and damage the boat. As the boat swings to one side the main leach can come very close to dead into the wind and if the wind catches the other side then the boom goes across the boat at whatever speed the wind is at. Anything in its way gets smashed out of the way or thrown overboard.

So, to compensate for this oscillation, the pole is often brought down on the mast in order to bring the two tapes closer together so less wind is caught up by the spinnaker, and the boat is sailed off of a dead run position and onto a bit of a reach. If the boat is already going hull speed (cannot go any faster anyway) then the boat is still fast if the pole is lowered on the mast, but is more in control.

An important point at that time in heavy winds is that there should be very little reaching going on at that point because the reach will not help a boat go faster when it is already going the fastest it can go, (its hull speed). The boat should be taken close to a downwind course so it goes through as little water as possible. That will be the fastest in getting to a downwind mark in very heavy winds.

Getting the bag up on the bow

The person hooking the bag up should always look in the bag first to see if everything is okay. The velcro fasteners tend to get clogged and come apart. This leaves loose clew ends in the bag. I will discuss packing the chute later so as to make it easier on the foredeck crew if the velcro comes off.

Having a crew on the bow both slows a boat and makes it point up into the wind less efficiently. Skippers don't like that so they want the lightest person and the quickest person putting the spinnaker bag up on the bow. The person doing this should follow a set routine that they never vary from. It does not matter if their routine is the same or different than someone else's. I hook on the starboard sheet to the starboard clew then the halyard to the head then the port side. If it is a Port tack hook up then I put on the port clew first. Once everything is on, I look to make a very quick check to see if it is done right. A white tape to one sheet, a white tape to the other sheet, velcro on, okay ready to go, get off the bow fast now and sit on the high side. Crew who stand slow the boat especially if they are on the bow.

Getting the Spinnaker up

Okay, this is where boats need to focus. On Force, there is a bit of a variation in the spinnaker pole set up from what a lot of other boats do. The pole is set at the mast onto its uphaul line and also the uphaul section that goes up to the mid mast is also fixed in the pole end. This creates a particular problem that has to be watched for every time the pole goes up on the mast, but this setup also saves some time.

When should the pole go up?

First let's discuss 'when' the pole should go up. When sailing up wind it is generally not wise to go straight to the laylines. It is best to tack several times up the middle, but on the side of the course that is favoured. Deciding which side of the course is favoured is a Strategy decision that takes years to learn and is generally done before the race starts and then reassessed as the race goes on because most always, the wind changes. One has to know what the wind is going to do before the wind does it. There are secrets to learning this skill. That would be for another day though. Then tactics come into play which is how the other boats mess up your nicely planned strategy.

If a skipper gets the boat close to the windward mark and it looks like the boat will make the mark without having to make two more tacks, then the spinnaker pole should go up generally when the boat is on a starboard tack. However, three things can happen. One, the wind can shift preventing the boat from laying the mark, two another boat from the left can cross ahead and tack right on our bow and steal our wind. The damn buggers cause you to NOT make the mark when you were making it before. LOL This is a part of sailing though, and so one needs to get used to it.

So, the skipper is the one who has to decide on the steadiness of the wind and if there is potential trouble looming off to the left. The skipper also makes the decision as to how close to the lay line to come. Should he sail a bit farther past the lay line just in case trouble arises or not? That is all skipper experience. Most all skippers will on occasion end up right on the lay line and then get caught at one time or another. That is the third thing that can happen. They didn't quite reach the layline. In that case the skipper is assessing if the boat has enough speed to do what is called 'Shoot the Mark'. That means coasting up to the mark with no power in the sails. If a boat is coasting up to a mark then it does not have any drive and it goes slow.

A sailboat pivots around the keel when it turns, with the bow moving one way and the stern moving the other way. So if the boat is very close to the mark, say inches, then as soon as the

mark comes dead abeam, or just a bit past that, then the skipper will steer the bow of the boat right into the mark. That will cause the stern to swing away from the mark and miss hitting the mark. But, the skipper does not want anyone doing anything on the boat when this is happening and the skipper does not want a person on the bow at this time because a crew on the bow slows the boat and hurts pointing (going up into the wind).

Lets suppose we are not shooting the mark now. The foredeck crew is asking the skipper if it is okay to put the pole up and the skipper is assessing if the boat will lay the mark unimpeded. This is why the foredeck cannot put the pole up when they think it should be time to put up the pole. They may not be tuned into the wind as surely the skipper is, and they probably cannot see all the boats under the Genoa off to port (the left side). Some foredeck crew with a lot of experience do all this assessing just like the skipper and pretty much know, but still wait for the signal from the skipper. So, as we are coming into the windward mark the newer people should be asking themselves, are we going to make the mark on this tack unimpeded by wind or other boats. Whomever is in charge of foredeck will always ask the skipper for the final okay.

And then sometimes it is so obvious that the skipper expects the pole up automatically. That is a whole other thing as crew get used to each other and each others skill levels.

Getting the Pole up

Once the decision has been made to put the pole up and the signal given, then the pole should go up as quickly as possible. Here is the bugaboo with the way Force carries the pole ondeck in an upwind leg. The uphaul has to be taken off the spinnaker pole's Easy Latch end that is down at the mast. Then the latch has to be taken off the uphaul line where it was placed to secure the pole during tacks. If the pole is taken directly to the mast fitting at the front of the mast then it will invariable be wrong. Why? Because the uphaul was originally set at the dock to be pulled back from its fitting on the pole cradle backward to go under the foredeck sail sheets and then clipped into the easy latch or the spinnaker pole. When it is taken off it is loose, it is very loose. That is the problem. The uphaul is loose.

Taking the pole directly to the mast causes a cross over of the end of the spinnaker pole crossing over the uphaul and now the uphaul is on the starboard side of the pole instead of being on the port side of the pole. The pole is rigged for the uphaul to go up on the PORT side of the pole. The procedure when the pole is detached from its deck position is that the uphaul has to be taken and placed to port OR, the uphaul has to have its slack taken out immediately as soon as the pole is unhooked from its deck-dock place. Having someone pull the uphaul taught immediately does not interfere with the mast person getting the pole on the mast. It actually helps. Some mast people are so good at what they do that they rarely make the mistake I am talking about now. People who have not raced for ten years can often make this mistake especially in chaos situations with high winds, choppy waves, and very short time lines.

A Pole Up Cross Check

The pit person is ideally positioned to see how the uphaul goes up provided they are looking at it as it goes up. Remember that when you raise a halyard on a sail you look at the sail as it goes up. Same with the uphaul. If you see that the uphaul is not on the port side of the pole as the pole is

going on the mast then tell the mast person that. If the pole does go up with the uphaul on the starboard side then in order to get to that starboard side, the pole had to be crossed over the loose uphaul such that the uphaul first goes under the pole and up on the starboard side putting a twist in the pole. If the pole is pulled up very hard then it will actually twist the pole on the mast so it looks like it is upside down. Rest assured it is not upside down. If one takes the pole off the mast and unwinds it so the uphaul is straight then that procedure winds the downhaul upside down and also twists the outboard end of the pole twisting the sheet around the outboard latch. That really buggers things up.

There are only two ways for the pole to go up, the right way and the wrong way. If the problem is caught very soon then just unhook the pole from the mast and flip the uphaul around the end of the pole to the port side and then hook the pole back on. If the pole goes up all the way and the chute is full then take the uphaul off, re-string the cradle to the top and reattach the uphaul. For this the pit person will have to release the uphaul line. If someone takes the pole off the mast and rotates the pole to straighten the uphaul, then the downhaul will need to be taken off, and also the sheet restrung through the outboard Easy Latch at the outboard end of the pole. Which way things are done depends on who is doing it and their experience.

As the spin pole **outboard** end goes up the pit person who is pulling it up should ensure this outboard end does not get trapped under the forestay. If the foredeck crew raises the pole manually then this never happens because they pull the pole onto the starboard side of the forestay and hold it up on their shoulder. However, there are times when the pole is taken up without a foredeck crew there. That's when you have to watch it.

The Practice drill

Probably the best thing for all new foredeck people is to practice at the dock putting the pole on the mast both the wrong way and the right way, and pulling up the uphaul themselves. Once they know the wrong way to do it then it is easier to remember the right way. If you don't know why it is getting messed up then that is a problem. And again once more, the secret is to have the pit person take all the slack out of the uphaul immediately as soon as it is unclipped from the foot of the mast.

As the Chute Goes up

Both the Clew and the Tack are key to getting a chute up without an hourglass. The clew has to be pulled back immediately and the tack too, in order to prevent an hourglass. If the cockpit crew does not have the sheet on its winch ready to pull and is in the process of getting the coiled sheet off the life rail as the chute is going up, then the chute will likely hourglass. If an hourglass does occur it is imperative to get it out fast, very fast, very, very fast. The reason is that the hourglass will spin and wind itself very tight.

As soon as the hourglass is noticed the pit person should lower the pole a bit so a crew can reach the luff of the sail. At the same time a foredeck crew should grab the tape above the pole and pull it tight so it is in a straight line, no curves, no bowing. If they have to stand on the pulpit to do this then that is what they do. This will allow the hourglass to unwind itself if the sheet is pulled at

the same time. The worse thing to do is release the sheet as that will make the hourglass twist more. If you catch it soon and tighten that tape then the hour glass will untwist. If it doesn't then the chute has to be lowered onto the deck and untwisted by hand. Very time consuming.

Jib Setts

When a jib set is called for that means one main thing for the foredeck crew. The pole will not go up right away. The pole has to be transferred from the starboard side of the bow to the port side of the bow and the port sheet strung through the Easy Latch at the outboard end of the pole. If the foredeck crew is experienced then the pole can go up on the mast and the mast slider brought down very low, but the uphaul is not pulled at all and the bow end of the pole stays on the bow. The Genoa is then brought over the pole during the jibe, usually by hand as the jibe progresses, then the pole goes up. In this particular case there is no calling the pole up from the cockpit as the everyone knows the pole must go up immediately after the jibe, after the Genoa goes over.

We are sailing up wind and a Jibe_Set is called. What does the foredeck crew do?
Assuming the bag is already on the bow and hooked up properly.

Before the Jibe

- #1. Take off the starboard spin sheet from the outboard end of the spin pole Easy-Latch.
- #2. Change the spinnaker pole from the starboard side of the forestay to the port side by dipping it under the forestay.
- #3. Hook on the **port** spin sheet through the Easy-Latch.
- #4. Put the pole up on the mast.
- #5. Keep the pole Up-haul back at the mast and kept slack.
- #6. Lower the pole-mast fitting so the Genoa can slide over the pole better during the jibe.
- #7. Call for the release of the starboard spin sheet fairlead.

During the Jibe

Foredeck helps pull the Genoa over the spin pole.
Foredeck holds the uphaul back at the mast and in control.

After the Jibe

- #1. Raise the pole on the mast to its proper height depending on the wind. The stronger the wind the higher the pole on the mast. This takes experience to learn. It is really important in heavy wind because in heavy wind there is so much force on the pole that it is very difficult to move the pole on the mast when the chute is up and drawing. Getting it up ahead of time is necessary in heavy wind.
- #2. Raise the outboard end of the pole by hand and ensure that it stays on the port side of the forestay as it goes up. Sometimes in heavy waves it can flop to the starboard side of the forestay and then the pit man cannot raise it. The pit man should always be looking at the outboard end of the pole as he starts to raise it to ensure that it is on the proper side of the forestay for that tack.
- #3. Go to the bag and release the velcro ties and feed out the spinnaker. (Note: On some boats they do not want a person on the bow and so eliminate this job.) Just remember that a person on the bow hurts the boat even on a run. The spinnaker pushes the bow into the

water and that is not good for fore and aft balance. A person on the bow aggravates this, so get off the bow quickly please.

Flying the spinnaker as the wind lightens

Boat balance with regard to heel when running. Okay a quick note now. If the spinnaker flyer is on the high side and the wind lets up to the point that the high side becomes the low side then the spinnaker flyer and the other crew should move to the low side. On Force, that spin flyer on the port tack also has to trim the Genoa and so is expected to do two jobs at the same time, and sometimes also hand off the starboard spin sheet to a below deck crew meaning a third job. Well, all of those jobs have to be done one at a time so things are a bit slower. See the next section please.

Taking the Spinnaker down

The person pulling the spinnaker down below deck and the people above deck too, need to remember to pull on the tapes, not the sail itself. This prevents tears. If it does not come down easily then something is wrong. Most commonly the Genoa was sent up trapping the spinnaker between the forestay and the Genoa halyard. Pulling hard on the spinnaker halyard while at the same time loosening the Genoa halyard sometimes gets the job done. The deck crew who hands the sheet under the boom should pull in the foot of the sail to keep it out of the water.

If the spinnaker floats down very fast then it can cover the Genoa winch and fairlead. That means the person on the Starboard Genoa cannot see the sail, the winch, nor the fairlead. In my opinion the person should not be cranking in the Genoa sheet blind. I have seen the spinnaker caught in the fairlead in past races and called for a stop on sheeting. This is very hard on the spinnaker to get caught in the fairlead. If the Genoa trimmer cannot see then I suggest waiting a few seconds for the chute to be cleared.

Packing the Spinnaker

Spinnakers should always be packed as fast as possible even when speed is not needed. The reason is to get good at packing fast. Packing fast will be needed at some point in time. Start by finding the empty bag that will be below somewhere. Sit on the high side and put the bag over your knees with the hood away from you. Find the starboard clew first. Fold it over your right thigh and sit on it, but pull back the sail so you can see your bare knee. Bunch the white taped foot in the right hand until you get to the port clew. Fold it over and sit on it, again pulling back the sail so you can see your knee. Stuff the white taped foot into the bag then follow the starboard tape, (green) to the head stuffing it into the bag as you go. When you get to the head fold it over your thigh just like the starboard clew and sit on it too. Now you have followed two sides and you are 100% sure there are no twists in the sail. Stuff the rest of the chute into the bag any old way as fast as you can. Now another trick comes into play.

Take the head first from your right buttock and push it down the front of the bag a bit so the starboard tape is to the right and the port tape is to the left. Then push the starboard clew and slide it down the right side of the bag like stuffing a shirt into your pants. Do the same with the port clew. Now when the foredeck person looks at the bag, if the velcro comes, off they will see

the one clew down the right side of the bag, the other down the left side and the head at the front and it will be easy to connect at the front of the bow. Remember that the way a chute is packed will NOT cause an hourglass as it goes up. What causes the hourglass is failure to pull quickly on the spinnaker clew as the sail goes up.

There are a few more things to discuss.

On Thursday Sept. 2, 2010 we had a start course as 270 degrees then just before the start the race committee changed it to 290 then at the start the wind continued to veer (turned to the right or clockwise) up to something like 320 or so. We had pretty much a single beat up to the mark with only a small hitch to windward on port. That wind shift told us there would be a Jibe-Set at the windward mark. If Foredeck crew can memorise this fact then they will know ahead of time why a Jib-Set is called. Someone wanted to know once how is it that some people know things in advance. Memorize this fact, if the wind veers a lot on the upwind leg (assuming the buoys to port flag is flying on the committee boat of course), then when we go around the two up wind marks the wind will be off to the left by a lot, by so much that the spinnaker pole will need to be on the port side of the boat. That means a jibe of the boat comes first before the spinnaker goes up, and the Genoa will be transferred over the spin pole to the starboard side of the boat first as well. That procedure is called a Jib-Set (jibe the boat-set the sail). See Jib-Set below.

Wind Shear

Why the starboard Genoa fairlead might be farther forward than the port one.

On Thursday we had an offshore wind starting at 270 (due West). That means more wind shear because the land slows the part of the wind more that is lower in altitude. On the water, it also slows the wind more as you get close to the shore. That means more of a difference between the top and bottom speeds of the wind on the mast. The wind was also veering moving from 270 to 290 to about 320. That veering wind means more wind shear because wind veers first up top and then down lower near the water. We also had a decreasing wind speed at one point and that also means more shear because the boat is going faster than the wind allows and so the component of induced wind was greater. Recall that there are three winds on a boat we need to consider. True wind, induced wind, and apparent wind. Vectors come into play and your high school math classes. See what happened now since you may have been sleeping during those math classes then you likely don't recall what a vector is. Wind is a vector that has both a unit quantity and a direction. Lets not get into that math here thought. Rest assure that the skipper HAS gotten into the math at some point in his sailing career and does understand it.

To sum it all up on Thursday we had a higher level of wind shear meaning that on the starboard tack the true wind twist was a veering twist as you go up the mast and the Apparent wind twist was also a veering twist as you go up the mast and that meant the two summate and create a lot of sail twist. Both sails have to compensate for this twist. The port Genoa lead is brought back more so as to loosen the leach and the top of the sail and let the top fall off more at the top to match up to the wind. The sheet needs to be eased more and the boat cannot sail as close to the wind as on the port tack, but will sail faster. The main sail must be matched to the Genoa. That

means the traveller goes up a bit and the mainsheet goes out a bit. Now both sails are matched to the twist of the wind and the boat is fast, but sailing off a bit, not as close to the wind.

On port tack

On port tack the true wind still veers, but the apparent wind now backs, comes more from the left as one goes up the mast. That means that there is less twist in both the sails. If anyone wants the math on this then just ask, but it will get into understanding wind vectors as one goes up the mast. The apparent wind backing and the true wind veering almost cancel each other out. That means the starboard fairlead is moved forward a few inches to tighten the leach. The Genoa sheet can be pulled in more now too and that allows the boat to go up more closer to the wind, ie point better. The main sail now needs to have it's traveller placed down more than on the other side and also the mainsheet needs to be pulled in tighter to flatten it more. Now we have the Genoa fairleads at different positions on each tack. If you set them at the same positions on each side in a sheering wind then you will go slow. Nobody said this racing stuff was simple eh.

Rounding the downwind mark

Next I would like to talk about the particular situation of rounding the downwind mark after the chute comes down. There are two ways various boats do this. One is to call for the Genoa sheet to be trimmed in hard and full right off the bat, before the boat fully rounds up, and then let the skipper settle into finding the groove. In my opinion that is slow because the sail is not driving when it is over sheeted, but sometimes it can be good if competition is right off the stern and the skipper wants to come up fast close to the wind or maybe even higher than optimal in order to force the competition to go down below us. Most times I would think the Genoa should be brought in full and driving and trimmed in as the boat goes up. That requires coordination between skipper and the trimmer. So the skipper should let the trimmer know what he is intending, a fast roundup or a normal roundup. A good thing for the idle port side trimmer to do is look behind the boat and see where the competition is and tell the skipper. Sometimes competition can be really sneaky when they are on your tail, they will try to go high and catch you off guard. The skipper needs to know that ASAP.

**Sail Trim,
July 22, 2010**

<http://www.oceansail.co.uk/Articles/WindTwistArticle.html>

Where we sail in North America we have the following very basic rules.

- * On starboard tack there is more twist in the apparent wind.
- * On port tack there is less twist in the apparent wind.

The stronger the wind sheer, the greater the twist of the sail that is required.

In the northern hemisphere we can expect to see more wind twist on starboard tack than on port tack, so we will need to sail further off the wind on starboard to keep the sails trimmed properly. In conditions that give strong wind shear we will be able to sail closer to the wind on port tack than on starboard.

If it looks like conditions will give a significant difference between the twist that you see on each tack then you need to be prepared to have different sail trim on each tack. This could mean having the port Genoa car further back than the starboard one to give more headsail twist on starboard tack. You may also find that you need to ease the mainsheet and move the main traveller up a little on starboard tack compared to port to give the main sail some more twist as well. Generally you match the twist of the two sails, the Genny and the Main

It takes quite a while (years), to learn how to assess wind shear and sail twist.

A very good web site.

<http://www.banks.co.uk/experttips.html>

<http://www.banks.co.uk/perf.html>

<http://www.banks.co.uk/pgt11.html>

Every time you are sailing there is wind shear. It is very important to know the differences between the two types of wind shear.

The first kind of wind shear is differential velocity shear. While sitting still, there will be no difference in direction between the upper breeze and the lower breeze. (Don't confuse this direction thing with the speed thing which will be different from bottom to top even when sitting still.) While you are sailing at an angle through the breeze, the wind that is moving faster at the top of your rig will create a lift near the masthead. You must compensate for this by moving the leads aft 2-3 inches. The larger the boat you are sailing the more noticeable this shear will become. It is also important to know this differential velocity shear will not vary from tack to tack.

The Second Component to Sheer

The second shear is twisted shear. This shear is caused by the wind coming from two slightly different directions from the boom height to the masthead. Twisted shear is easy to recognise because apparent wind angles will vary from tack to tack.

Here you will sail with one lead further forward than the other to keep your sail breaking evenly. The tack that has the car slightly farther aft will always be a little faster than the other tack. The closer you sail to the poles (North or South) the more often you will sail in sheared wind.

Waves

The final consideration while trimming the Genoa is waves. Often large waves will not affect your settings greatly, but you need to play the sheet while going up and down the waves. As the boat starts working its way up the wave, give the sheet a little ease. Once over the swell, trim in tight and let the boat ride down the backside of the wave. Obviously this is not practical in a 30 footer were it will be more important to get your weight out!

If there are short choppy waves you will need to move the leads forward 2-4 inches and ease the backstay (or runner) and sheet tension. Waves will usually be into the waves or more broadside on one tack than the other tack. When this occurs you need the leads further forward with the backstay (or runner)and sheets eased more on the tack sailing into the waves. This tack will be slower than the tack with the waves broadside.