

# A Review and Guide to 210 Tuning and Boat handling



by Dave Johnson Jr.

## *Index*

Setup/Tips .....	2
Mast Butt.....	2
Forestay .....	3
Shrouds .....	3
Traveler .....	4
Jib Trim.....	4
Main Trim .....	5
Backstay.....	6
Cunningham.....	7
Sailing your boat.....	7
Upwind .....	7
Downwind.....	8
Closing.....	11
Thanks .....	11

## 210 Guide By Dave Johnson Jr.

### A quick glance

Perhaps the greatest thing about sailing is the chance to improve your sailing skills by helping others. Over the course of racing 15+ years, I have learned many techniques and basic boat tuning that has really helped propel me forward. The 210 is one of the ideal boats to learn and adapt many skills from other one designs to a hard chine keel boat.

Over these past two years, my crew and I have come away with two national championships. These victories are in no small part because of one person, the type of boat, or the sails. We were fortunate to charter two reasonably new boats. The difference was dramatic in set up differences but the ideas of how we sailed each boat was very similar.

This overview is a perspective outlook at what we did to sail fast and how you can enhance your skills to make it to the front of the pack, and keep your head in “the game,” not in the boat!

### Set up

The initial setup of your boat on shore should be very basic. Our settings for a normal sailing day were how we started out on shore. From mast butt placement to rig tension, our boat was setup to go racing in specific conditions. Yet those specific conditions caused us to change very few things before we went out sailing.

### Mast Butt

Mast placement on boats is always a big concern. The butt plate on the newer boats has pins on the front and back to hold the plastic slide butt plate in position. Our position has always been our Aft pin in the second from last hole on the plate. This should allow your rig to be vertical. If you place the rig back one hole, it will allow for more power and less pointing ability. Placing the mast butt further forward allows for de-powering of the sail plan and flat water. Changing the butt position is a very drastic maneuver. The same characteristics can be accomplished by forestay length and backstay tension. We preferred to keep our placement in all conditions in Milwaukee '03 and Falmouth '02. On the first day

of sailing in Milwaukee, we moved the butt forward, but moved it right back after we decided to see what the conditions were like. The plastic slide on the bottom makes moving the butt easier out on the race course. It may require a small kick or pull to get it to move.

Remember to place your pins into the correct holes before you try to kick the butt.

I do not have an exact measurement from the bow. For the older boats, it may be necessary to find a new boat and get the dimension for the tuning of your boat.

## Forestay

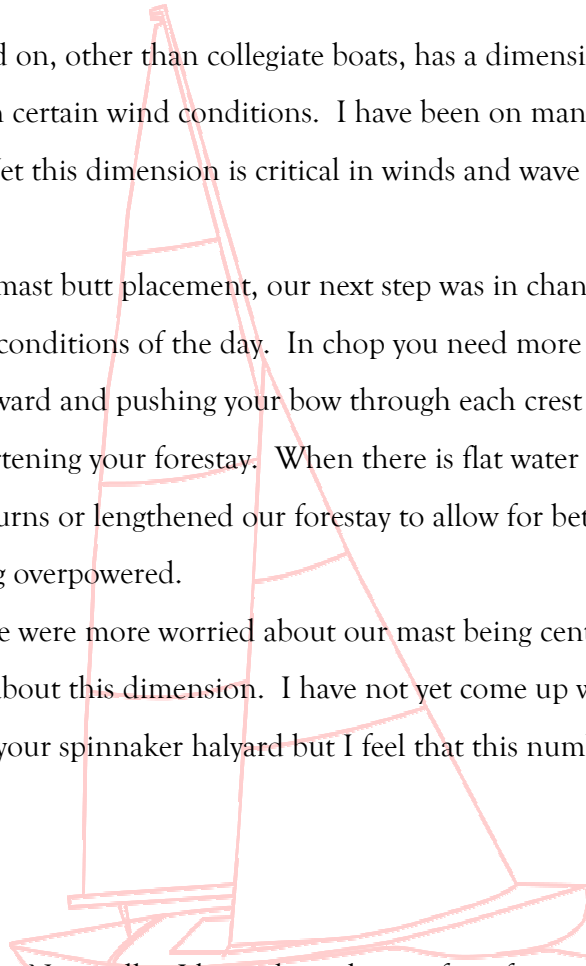
Every boat that I have sailed on, other than collegiate boats, has a dimension that is critical to the boats performance in certain wind conditions. I have been on many 210s that don't even focus on this point. Yet this dimension is critical in winds and wave conditions that vary.

Since we never moved our mast butt placement, our next step was in changing our forestay dimension to run with the conditions of the day. In chop you need more power. To do that you need your sail plan forward and pushing your bow through each crest and trough. You can accomplish this by shortening your forestay. When there is flat water or wind above 12 knots, we usually took off turns or lengthened our forestay to allow for better pointing along with not struggling by being overpowered.

Even with our two boats, we were more worried about our mast being centered and vertical in our boat than worrying about this dimension. I have not yet come up with a good number from full hoist on your spinnaker halyard but I feel that this number is somewhere around 25'.

## Shrouds

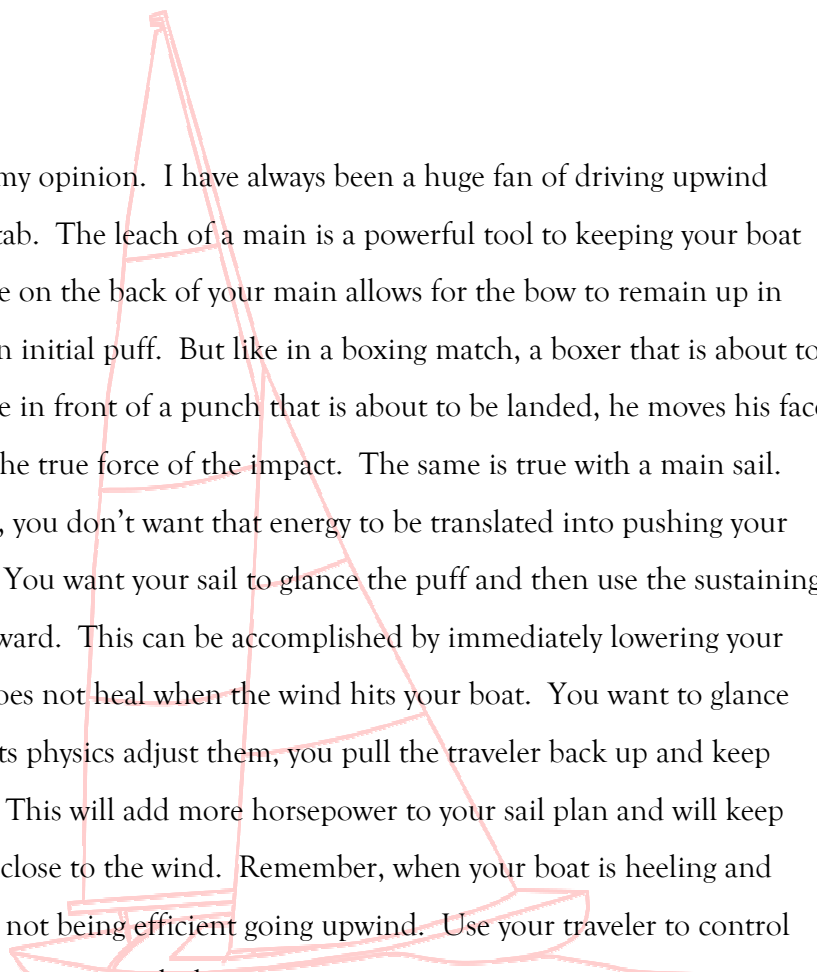
Here it is, the key to success. Not really. I have always been a fan of a rig that doesn't fall off in light air. This is accomplished from only having my uppers tight and my lowers reasonably loose. Our uppers are at 32-35 on the Loos Standard - A gauge. This number is a great number because it is neither loose nor tight. Our lowers are only hand tight. They show sitting at dock to be loose, and when your backstay is on, they should look loose even more so.



When the wind conditions pick up, I only add more tension to my lowers. This reduces the sag in the mast and doesn't allow for your main to remain powered up. This is a judgment call on how many turns, but I add about 3 full turns on each side. This is a great estimate because both boats that we have sailed in the nationals only allows for a certain amount of throw on the backstay. If you are not able to move your backstay very much to de-power your boat, I would suggest adding more turns to your lowers and perhaps removing one turn off your uppers. This will allow for the top of the mast to sag and will de-power your sail plan.

## Traveler

The true key to the 210 in my opinion. I have always been a huge fan of driving upwind using my traveler as a trim tab. The leach of a main is a powerful tool to keeping your boat pointing upwind. The force on the back of your main allows for the bow to remain up in the wind if your boat hits an initial puff. But like in a boxing match, a boxer that is about to be hit does not hold his face in front of a punch that is about to be landed, he moves his face with the punch to remove the true force of the impact. The same is true with a main sail. When a puff hits your boat, you don't want that energy to be translated into pushing your boat sideways (to leeward). You want your sail to glance the puff and then use the sustaining force to push your boat forward. This can be accomplished by immediately lowering your traveler so that your boat does not heel when the wind hits your boat. You want to glance the blow and when the boats physics adjust them, you pull the traveler back up and keep your boat moving forward. This will add more horsepower to your sail plan and will keep your bow and boat moving close to the wind. Remember, when your boat is heeling and then going upright, you are not being efficient going upwind. Use your traveler to control this and keep your boat going in a straight line.



## Jib Trim

This has always been a hard topic for me as a skipper. I have always been one to pinch. Yet when I don't have the legs (boat speed) to keep up with someone, I am probably sheeted in too tight on my headsail. I like to refer to my jib as my fuel injector for my main. If it is too

tight, then the additional flow off the leeward side of main is not being achieved and I am not going to be moving fast. If my jib is too loose, then I am not focusing enough of the wind along my main to allow for that extra horsepower. This is also known as the slot. The slot for our boat has been consistent each time we have gone sailing. In the light air, we prefer about 4-6" off the top spreader and 3-5" down at the bottom of the shrouds. This won't allow us to point but the gains in light air are made with speed in these boats. In medium air, we usually go to 2-4" off the spreaders and kissing the shrouds. This allows a perfect balance with our main and jib...of course keeping in mind that the sail plan (both sails) is not being de-powered. When the air is heavy and I am starting to de-power using my backstay and Cunningham, our boat sails with the jib 2" off the spreaders and strapped tight (with horizontal wrinkles) along the foot of our jib. This setting is a preference that I have always liked because I can tell how tight our jib is by looking at the shrouds to leeward. This is a comfort setting for us because we like to sail high and usually find a good groove in the high lane using our traveler consistently.

### Main Trim

Well I have been known for speaking highly of the Quantum Sails that we used in '02. The leach of the main was very long (max length) and allowed us to be block to block in wind conditions of 7+ knots. This was great because we used our other controls to keep us moving in the right direction. But main trim on a 210 is tricky. I have been trying to perfect it myself but find that I am still working out the kinks.

The normal theory of sail trim needs to be thrown out the window. Most of the time, your optimum main sail trim is when you sight up the boom vertically to the top batten of your main. You are looking for that batten to be parallel with the boom so that the twist of your main is even. This allows for steady flow around your main, neither dumping nor stalling your sail. The key to knowing whether your sail is trimmed properly is by achieving the top telltale flowing back all of the time. Yet I don't sail this way with my boat.

Most of the sail designs in this class have the battens parallel to the leach of the main. This means that the battens are pointing down, towards the tack of your sail. When the telltales on the sail are sewn on, they are sewn parallel to the batten. This will give you a false sense

of how the sail is being trimmed. Unless you are in very light air, you want this telltale to be stalling almost 70% of the time. Stalling of the telltale should be to leeward when you cannot see it from the windward side of the boat. When you are sailing upwind, the telltale of your main should be stalling a majority of the time and this can be accomplished by trimming your mainsheet in more. The problem that most sailors have is that they don't watch this when the conditions change. If your main is stalling when you want to go fast, then you are going to go slow. Be sure to watch for this when wind velocity changes so that you aren't 'choking' your sail and not allowing for the wind to flow along both sides.

### Backstay

Not many people believe that the backstay is a powerful tool. If you were on our boat, this theory would be proven wrong in a matter of minutes in puffs and heavy air. The position of this control is in many places on each 210. My bowman had the fortunate job in Milwaukee '03 of dealing with the backstay. His arm in a puff was fully extended beyond his head, taking much of the power of the puff and allowing it to blow past our main.

When the backstay is applied, it does many jobs. The first is that it compresses the mast and shortens the distance from the crane (top of the mast) to the leach. This of course makes your leach tension less and allows for you to dump air out of the main. When you do this, it accomplishes what the traveler does, but also allows for the wind to reshape around the mainsail and it's camber. This can be useful when you are in waves and need an immediate change to your sail plan. The second job it does is that it tightens your forestay. This is good because when your forestay is sagging it allows for your headsail to be powered up. Many people think that the only things that adjust your jib are the jib lead and the tension on the halyard. This is a false conclusion because when your forestay is tight it keeps your luff tight and prevents it from sagging toward the leach. The simple analogy is that when a line is taught, it is flat. But when one end sags towards a stationary point (i.e. the leach) it powers up the sail with sag. When you tighten the backstay, you tighten the forestay and that also de-powers the headsail.

## Cunningham

A huge tool that most people don't understand. The key to a Cunningham is to flatten the entry of your main. This reduces your horsepower that the main can create. In both the boats that we sailed in each national event, we used a lot of tension because our sails were so old. We almost always had Cunningham on because our boat is set up with all of the above dimensions to allow us to de-power sooner rather than later. I would recommend that most boats use their Cunningham in 10+ knots. A good base is that in conditions where you are not overpowered, you should have scallops or horizontal wrinkles half to a third of the way up the luff of your main.

## Sailing your boat

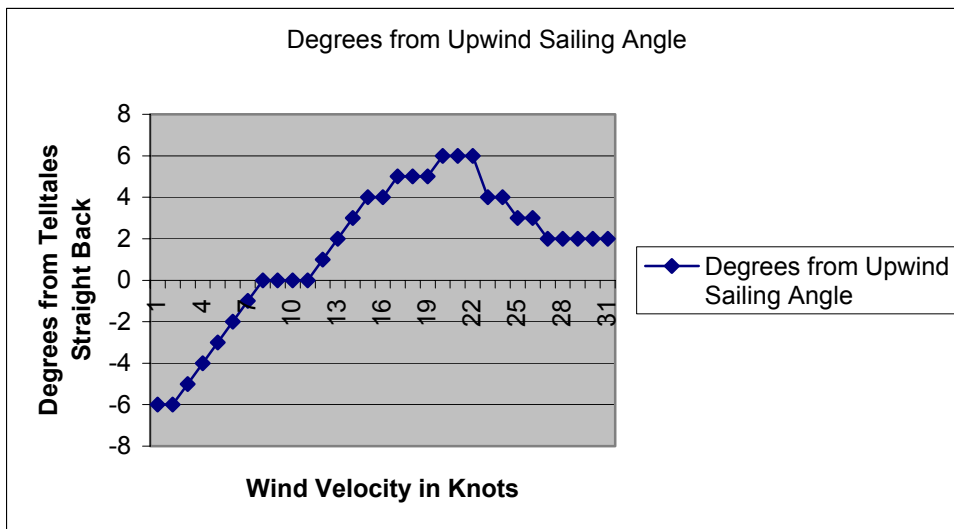
The 210 is a special boat because it is so long. The length of the waterline (LWL) is remarkably long and with the hard chine, it makes your boat balance out very well with the small rudder. This hull design is unique because for how inefficient the rudder is, the total balance of the boat is very reasonable and can be adjusted with all of the above conditions. This part of the guide is going to look into how we sailed our boat, and try to relate it to how you can pick apart your sailing techniques.

## Upwind

Everyone has his or her own technique for how to sail a boat upwind. These practices vary from pointing to footing and from heeling to being flat. The 210 class is no exception to the variations that people have to making a boat go fast.

When we sail our boat, we made sure of some vary basic stuff. First, in all wind conditions, making sure that our windward chine was out of the water by about 2". This allows for the LWL to be extended and for the Center of Lateral Resistance (the Keel) and the Center of Effort (or the combination of power from the sails) to be skewed in such a way as to create a small lee helm effect. Second, when going upwind we are very conscious about moving our weight to make sure that we keep our chine out of the water. This action does not mean jumping around, but rather moving your weight smoothly and not making sudden movements. In light air this is a key factor. Third is how the skipper drives the boat to keep

it moving forward. Most of the time, I refer to the upwind sailing angle of a 210 as being when both windward and leeward telltales on the genoa are flying straight back. This setting is common for almost all classes. The graph below describes how I sail my 210 in relationship to the wind velocity in knots and angle away from keeping my telltales straight back.



Having the traveler and the backstay in the hands of the driver may make his job more difficult. Earlier in this guide I referred to my crew having the backstay adjustment on the '03 Nationals. This is fine, and as a preference, some people don't mind having the backstay adjustment away from the driver. But the driver having the backstay and the tiller at his discretion allows for him to have the better feel for the balance of the boat. As a driver, I rarely have the mainsheet in my hand, unless the wind conditions are very light or very heavy. The controls that I have around my area to maximize the boat's speed are the traveler, backstay, and tiller.

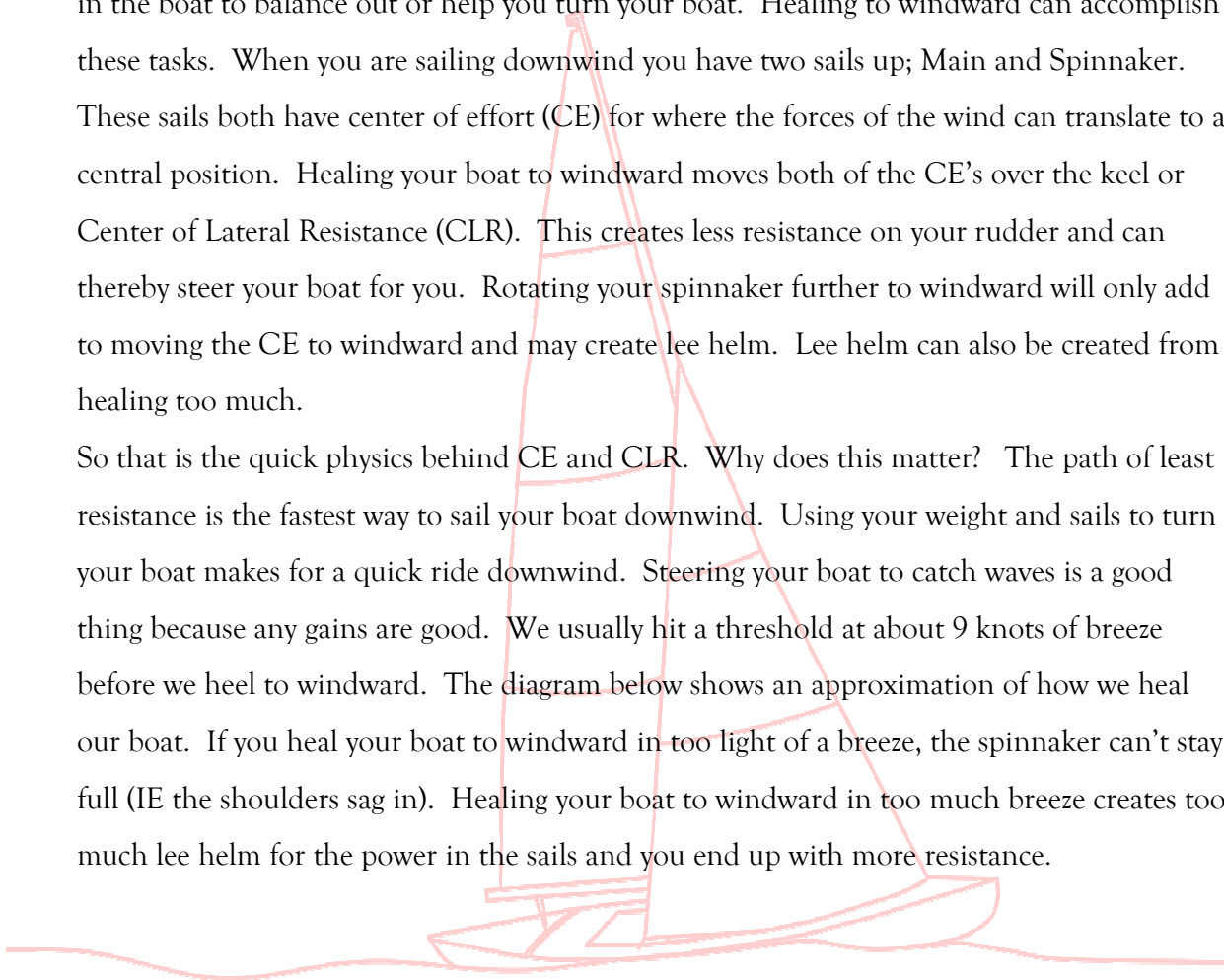
### Downwind

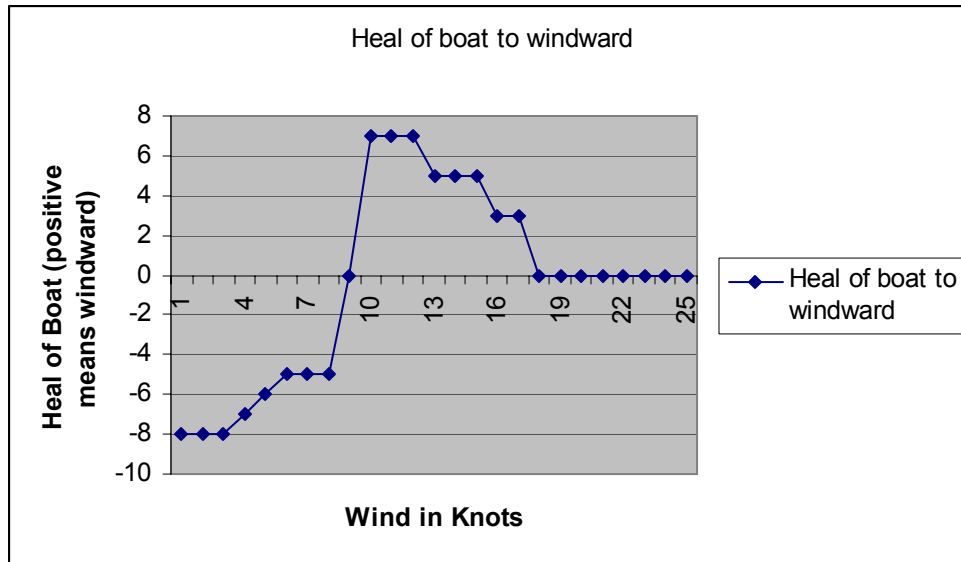
Sailing downwind has always been the most fun for me. For Doug and Ben, sailing downwind has always been where they work the hardest, and it has shown. Our teamwork downwind along with our technique allows for us to sail rhumb line faster than most boats. This is accomplished by a culmination of a couple of things. One is heeling our boat downwind.



I feel like our boat has the patented look of Doug and I standing up on the windward seats and Ben looking back upwind. Downwind sailing in most fleets has gone away from the Triangle. Some classes still use an Olympic or Gold Cup, but the Windward Leeward courses are being shown to be the favorable choice for RC and regatta sites. This course allows for the possibility of sailing straight from the Windward mark to the Leeward mark. Now anyone can just point his or her boat dead downwind and hope to go fast but that usually isn't the case. When you are attempting to sail dead downwind you want the forces in the boat to balance out or help you turn your boat. Healing to windward can accomplish these tasks. When you are sailing downwind you have two sails up; Main and Spinnaker. These sails both have center of effort (CE) for where the forces of the wind can translate to a central position. Healing your boat to windward moves both of the CE's over the keel or Center of Lateral Resistance (CLR). This creates less resistance on your rudder and can thereby steer your boat for you. Rotating your spinnaker further to windward will only add to moving the CE to windward and may create lee helm. Lee helm can also be created from healing too much.

So that is the quick physics behind CE and CLR. Why does this matter? The path of least resistance is the fastest way to sail your boat downwind. Using your weight and sails to turn your boat makes for a quick ride downwind. Steering your boat to catch waves is a good thing because any gains are good. We usually hit a threshold at about 9 knots of breeze before we heel to windward. The diagram below shows an approximation of how we heal our boat. If you heal your boat to windward in too light of a breeze, the spinnaker can't stay full (IE the shoulders sag in). Healing your boat to windward in too much breeze creates too much lee helm for the power in the sails and you end up with more resistance.





Another go fast for us is that we always look back upwind. For Tim Putney, he always thinks that we are nervous of him catching up, but most of the time, we are looking for wind. In both nationals, we gibed more times than any boat downwind. If you drill your team well, you really don't lose speed in gibing. We always look for any gain in velocity or in wave angle to accomplish the fastest route to the lee mark.

The next downwind technique is what I call projection. This is very basic. Projection of your spinnaker is using the sail area to maximize your power downwind. Doug and I use two guides to trim downwind: the horizon and the clews.

When your guy is near the pole, your clew shows the angle of the spinnaker relative to the horizon. When you look at it, you see the leach and the foot. We try to make about 18" of our leach perpendicular to the horizon. This allows for the shoulders of spinnaker to be full and for no lift to be present with our spinnaker being tilted one way or the other. The second guide is making your clews level. This is fairly simple...make your clews level! By using your topping lift you can adjust your outboard pole height to make your windward clew parallel with the lee clew. This once again allows for the balance of your boat and will create only forward momentum and not have your spinnaker pushing in any other direction but forward. Some people over rotate their spinnakers. This is noticeable when the belly of their sail is rotating around the end of pole. This is not fast. Another thing is when people

ease out their guy and sheet and have the spinnaker 1-2' in front of the pole. This is only spilling air out the bottom of the sail and doesn't make you go faster.

Some people like messing with the inboard end of the pole. The only check that our boat has on this dimension is to make it perpendicular to the outboard end so that the pole is fully extending the spinnaker out away from the boat.

## Closing

I hope that these ideas and techniques are useful to some who want to work to improve their boat handling abilities. Always feel free to email or contact me for further information or discussion.

Dave Johnson  
1362 Burlington Drive  
Hickory Corners, MI 49060  
[davejohnsonjr@tds.net](mailto:davejohnsonjr@tds.net)

## Thanks

Thanks to my parents for supporting me in my ventures of sailing and always trying to improve myself.

Thanks to the 210 Gull Lake Fleet for their support through the years.

