



Wayfarer Racing

rig for racing
racing techniques
strategy and tactics







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Introduction

The information in this document is collected from the UKWA Wayfarer and the Wayfarer Institute of Technology websites with their links to other interesting sites. Especially the information of Al Schönborn at the W.I.T. website combines an enormous amount of information. From himself, Derwyn Hughes, Mike McNamara, and a number of other Wayfarer sailors. I collected this information and for my own use reorganised it a little bit in this document. After that I thought that it could be of interest for others as well.

I started building this document for my own use and see it as a growing document. For me it is in a way it is an extension of the information in the Wayfarer book of UKWA. Not to replace this book but to combine other publications (many originate from Wayfarer Magazines/Newsletters of the last 10 years) in a form that is available near your boat or for more than those who have a large complete library or access to internet. But after doing this I realised that it can be used by others as well. So please feel free to do so.

From the introduction at the website of WIT comes the following information about the original authors:

Al Schönborn, W3854, Shades, (many times Canadian Champion and Class Coach) arranged all the information together and made many comments and content also due to the position of webmaster and the e-mails and letters he got from many enthusiast Wayfarer sailors. Part of the material was taken from four great videos on Wayfarer sailing (available from the Canadian Wayfarer Association).

Many of the paragraphs are of the hand of **Mike McNamara** W8868, (many times World & UK Wayfarer Champion) and come from the training sessions for UKWA members.

Derwyn Hughes W4615 (one of Canada's best and most enthusiastic Wayfarer racers), work filled about 12 pages of the February 1995 Whiffle, much of this is used.

As mentioned many times in the articles the original authors hope you find some of this helpful in sailing your Wayfarer. Any suggestions you may have for improving these notes will be appreciated. Internet is a splendid way to do so. Contact the authors or bring in information via the webmasters of WIT (Al Schönborn), or UKWA (Richard Readings). The websites and the-mail addresses are mentioned in annex 2

Enjoy your sailing!

Jan Katgerman (W5535, Obelix)





1 Rig for racing¹

1.1. Hull, rudder and centreboard

1.1.1 Hull

- smooth with no major imperfections
- clean fiberglass with fiberglass cleaner
- fill imperfections with epoxy and micro-balloons
- final sanding with 600 paper
- put extra effort into the first and last three feet of the hull

1.1.2. Rudder

- front edge must be vertical when in sailing position;
- sides of the blade to be smooth and flat;
- leading edge to be rounded into a parabolic shape;
- shape leading edge to razor sharp for 1 inch above & below water line;
- trailing edge to be tapered to a "V" shape²;
- the back of the "V" is to be cut off flat about 0,3 cm (1/8 ") wide;
- tapering of rudder (chamfer) is not be more than 5,1 cm (2 ") in from the edge (max. permitted by Class Rules);
- rudder fittings must be strong and well fastened;
- through-bolt fittings wherever possible.

1.1.3. Tiller

- Must be close fit into rudder stock: no "play" - if necessary, put tape around the wood so that it just fits.
- rudder tie-down to be heavy, double shock cord³
- need a tiller extension with good grip (tape every 15 cm) - try "golfball" technology: a golf ball fastened to the end of the tiller extension makes it easy to steer when hiked.

1.1.4. Centreboard

- sides of the blade to be smooth and flat
- leading edge to be rounded into a parabolic shape up to 6,4 cm (2.5") in from the edge (max. allowed by Class Rules)
- trailing edge to be tapered to a "V" shape up to 6,4 cm (2.5") in from aft edge (see also note on trailing edge or rudder) the back of the "V" is to be cut off flat about 0,3 cm (1/8 ") wide
- when the CB is fully down, the leading edge must be raked slightly back so as to make an angle of no more than 83° (Class Rules) when fully down
- the CB must extend down from the keel no more than 100,6 cm (3' 3 5/8") (Class Rules)

¹ Check class rules for detailed specifications and limits.

² Al Schönborn's note: This is a good wood to make the wood core. In sanding the glass or epoxy covering, I try to give this edge an air foil shape, too. See also trailing edge of centreboard.

³ Al Schönborn's note: I like to use mostly 4-mil pre-stretch rope with a 6" loop of ¼" shock cord just before the end that goes around the hook under the tiller. I use a bowline to tie another 6" piece of 4-mil rope onto that loop. I then use that little piece of rope to drag the shock cord over the tiller hook. This holds the rudder down very well!



1.1.5. general boat & sail security

- Tape all pins & rings to prevent unexpected loosening or failure. This also covers sharp ends which could rip a spinnaker.
- Cut off the ends of any bolts or screws to just the right length so as to prevent ripping of sails and minimize weight.
- Put on a little silicone sealer after assembly of nuts & bolts to prevent loosening and cover any sharp ends. Especially important if trailering for long distances⁴. When sailing, securely fasten anything of value in the boat to minimize losses when you capsize. Some net bags and Velcro straps are handy for this.
- Carry a small tool kit in a "floatable" container for on-the-water repairs. (knife, duct tape, some light wire, spare pins (and rings to hold them in place), length of light line, needle nose pliers & adjustable wrench, pencil & sun tan lotion) Fasten this kit to the boat.
- Carry a large bailing bucket (say 20 liters) and tie it with a long enough line to reach anywhere in the boat

1.2. Mast & rigging

1.2.1 spreaders

- length to be 20 inches from shroud to mast;
- set angle so that distance between shrouds is 96,5 cm (3' 2");
- angle the spreaders up slightly from mast to shrouds, hold in place with duct tape on the shrouds⁵;
- if spreaders are adjustable, angle further forward (restricting mast bend) for strong winds and further back (allowing more mast bend) in light winds.

1.2.2 shrouds

Use adjustable stainless steel straps to fasten the shrouds to the hull. These are stronger, easier to adjust and more reliable than the bottle screws/turnbuckles. Check that all pins which fasten the shrouds and forestay to the mast and hull are well secured. Tape the curled wires (split or circular pins) which hold the pins in place to avoid accidental loss of a pin and resulting mast failure. When under sail, the rig should have approx. 150 kg (330 pounds) of tension in the shrouds. This is set by varying the jib halyard tension. Since most people do not have a tension measurement device, simply increase jib halyard tension while sailing to windward until the leeward shroud is no longer slack. This will require a very tight jib halyard in strong wind and relatively little tension in light air. Jib halyard tension is controlled by either a Highfield lever or a magic box. The magic box is preferred since it is easier to adjust while sailing and has a wider control range. The magic box is either mounted on the mast or along the side or top of the centerboard housing. If the magic box is on the CB housing pulling back on the halyard a block must be fixed behind the foot of the mast to prevent it from moving back too far thus creating excessive mast bend⁶.

⁴ Al Schönborn's note: If anyone should know about this, it's Derwyn who, at least four times, has trailered W4615, Big Bird, 3321 km from Calgary to Toronto [and back, of course - another 3321 km]

⁵ Al Schönborn's note: the theory being that the spreader should bisect the angle made when the spreader pushes the shrouds outboard

⁶ Al Schönborn's note: There are those who find such mast bend assistance quite useful to promote bend in light airs. Excessive bend in windier conditions can always be prevented by chocking and spreaders angled further forward.



1.2.3 forestay

setup

The forestay primarily serves to hold up the mast when the jib is not in use. When the jib is up and winds are strong, the rig tension is provided mainly by the jib halyard.

When the wind is light, it is helpful to use the forestay to provide rig tension. This allows the jib luff to be kept looser thus facilitating some luff sag. Luff sag is built into each jib and it adds to the power of the sail. Keep some tension on the forestay even under medium and strong wind conditions so that it will be straight under all conditions of jib halyard tension and does not interfere with your jib tickers (wind indicators).. This is very useful as a reference for checking sag of the luff of the jib. Under most wind conditions, target for approx. 5 à 7,5 cm (2 to 3") of sag between the middle of the jib luff and the forestay. This is set by adjusting the jib halyard tension.

Forestay tension control can be provided by shortening the forestay by about a foot. I install a small block on the foot of the forestay. I install a block on the bow bracket. Run a strong 4 mm pre-stretched line from the bow bracket up to the forestay block, back down to the block on the bow bracket, then along the deck, back to a jamb cleat near the mast. I install a short section of line from the bow bracket up to the forestay as a safety line in case the forestay control line breaks or comes undone.

You can also replace the bottom 46 cm (18") of stay by a shock cord loop rigged in such a way as to take up slack as the jib luff is tensioned. This keeps the forestay wire under some tension (and fairly straight) and out of your jib at all times. As a back-up to the shock cord we use a short length of thin line (3 mil.) which we tie between the end of the wire and the shackle (or cotter pin) at deck level.

Installation

The shortening of the wire part of your stay must be done with good wire cutters and a swaging tool. Before doing this, you take three feet of 6mm (¼") shock cord, and make a loop out of it by overlapping the two ends about 2,5 cm (1") and putting a seizing around the overlap with whipping line. Then hoist your jib to maximum tension (for a blow), attach the loop via shackle or cotter pin at the bow while detaching the forestay there. Keeping the seized part of loop away from bends, stretch the loop parallel to the jib luff until the cord begins to stretch. At the same time pull the stay tight parallel to jib luff. Mark (with tape) the point on the stay that is reached by the top of the loop. Cut the wire there and swage in a loop with thimble. Use a small shackle to connect wire loop to shock cord. Tie one end of the back-up line (with a bowline) around cotter pin or through shackle at deck and the other with a round turn and several half hitches through wire loop.

Note: I discovered that forestay wire is very stiff and hard to swage and have replaced my forestay with wire cannibalized from an old main halyard which is much easier to work with!

the forestay tackle

The jib halyard/magic box combination is easily used to put up to 180 kg (400+ lbs.) of tension on the rig. Such pressure translates into mast compression which in turn becomes pre-bend when you push forward on the mast about 1 to 2 metres above deck level.

- The problem with using the jib halyard to get the required tension is that pre-bend is only needed in light airs when such tension removes all jib luff sag for which all jibs must be designed. This in turn makes for an overly flat luff entry which makes the steering groove unacceptably narrow and steering consistently within the groove impossible.



- What we therefore do is crank up the tension with the halyard and then take up any slack in the forestay with the aforementioned tackle. Once the stay tackle is well tightened and cleated, it keeps the rig tension required for pre-bend while the halyard can be slackened off to give us any amount of luff sag that feels comfortable.

On "Shades", we have cut enough off the bottom of our forestay to accommodate a 30-40 cm. tackle which consists of about 1.5 metres of 4 mm. pre-stretch line. This is tied to the becket of an RWO #R4959 (V-jamming block with becket intended for windsurfing use) attached to the bow plate where the forestay used to be attached from the becket, the line goes up about 30 cm. to an RWO micro-block (#R1530) which has been swaged into the new loop at the lower end of the forestay the line then leads down around the sheave of the R4959 before exiting through the V-jammer which we have facing aft. The amount of pre-bend you get depends on:

- how far aft your spreaders are angled
- the amount of rig tension applied
- the inherent flexibility of your mast section

Note: Abbott masts are harder to pre-bend but word from the Fanshawe Fleet is that using a minimum diameter 6 mm (¼") mast pivot pin facilitates such bend.

1.2.4 mast rake setup

Tighten the jib halyard to put tension on the rig but not enough to cause mast bend.

Fasten a tape measure to the main halyard and hoist to the top of the mast.

Check the distance from the top of the mast to the bottom of the bridge created by the traveller bar over the transom opening for the tiller. This should be 716,3, +/- 1cm (23' 6" +/-½").

Adjust the two shroud lengths evenly until the desired rake is set. For shrouds with the adjusting plates, each hole change affects the measured mast rake by 5 cm (2")⁷.

Check that the mast is perfectly vertical by measuring the distance from the top of the mast to each end of the traveller. This distance should ideally be the same to both sides⁸.

Place plastic tubes over the shroud adjustment plates, or wrap with plastic sheet to protect the pins and prevent them from coming loose or tearing sails.

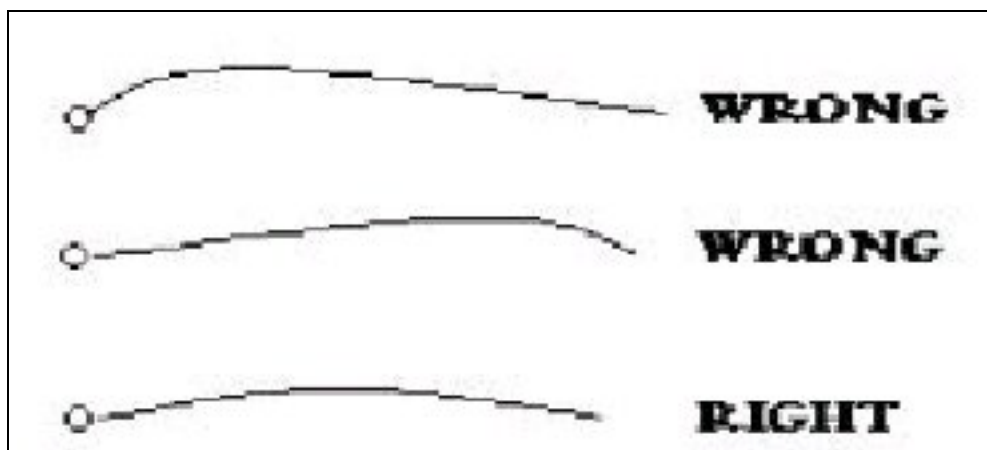
1.2.5 mast bend check

The mast should be as straight as possible athwartships (from side to side) while under sailing load. At the same time, the ideally curved mast would have fore and aft bend such that the mainsail, throughout its entire height, has a fair, even curve from luff to leech.

- If the mast has too little bend, you will get the draft too far forward in the main (*see top illustration, below*)
- Too much bend flattens the forward part of the main excessively (*middle illustration, below*)
- The right amount of bend matches the luff curve installed by the sailmaker and gives a nice even curve from luff to leech (*bottom diagram, below*)

⁷ Al Schönborn's note: Shroud plates with double rows of offset holes give 2,5 cm changes as you move diagonally up or down.

⁸ Al Schönborn's note: A difference of up to 6 mm (¼") is no big deal in my opinion!



All your numbers and settings regarding mast and spreaders and rig tension are basically only a means to getting this desired sail shape. In the final analysis, nothing else really matters. Former Fireball World Champion, Joan Ellis, once said that all their rig changes across the spectrum of conditions were simply aimed at making sure their sail kept the shape the sailmaker designed for it. In Wayfarers, I would suggest that it is necessary to make slight adjustments to the basic shape as follows:

- 1 when consistently overpowered: flatten the sail but keep the even curve. To do this, you use the vang to bend the mast more than usual (4 to 6") and then add sufficient main cunningham to drag the draft back forward until your fore/aft curve is even⁹.
- 2 when sailing in difficult steering conditions: sail with a draft further forward shape to create a larger, more forgiving steering groove. This is usually done by underbending the mast and/or adding lots of cunningham.

How the aforementioned is achieved on "Shades "

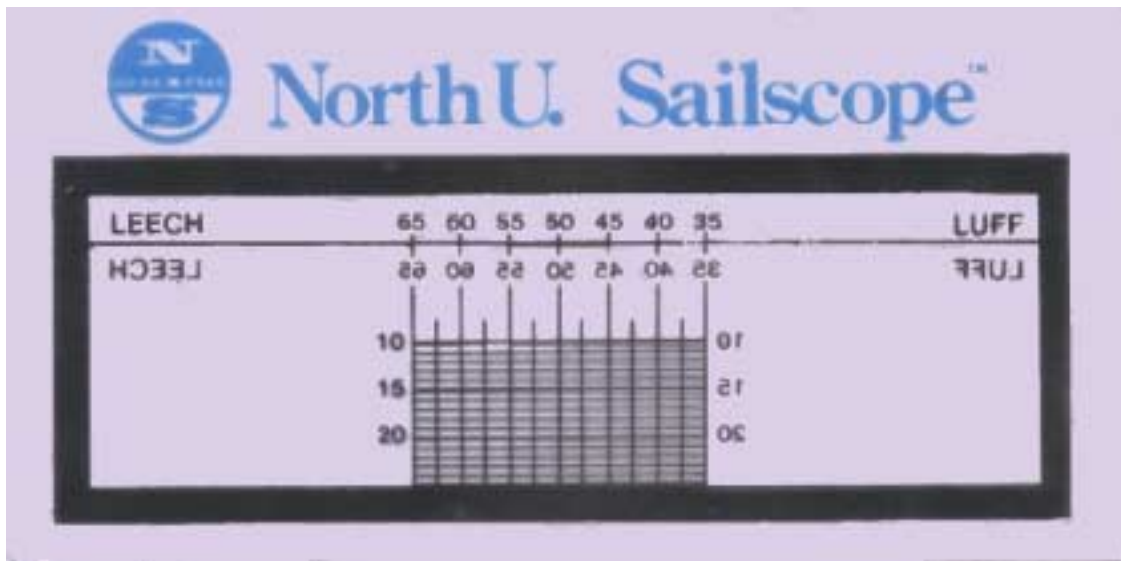
Our spreaders are 50,8 cm (1'8") long, measuring from the side of the mast to the inside edge of the shroud, and their fore/aft angle is adjustable by means of the blue Proctor spreaders with the wing-nut bolt at the inboard end. Mast bend of 5 à 7,5 cm (2 - 3") at spreader height makes our main set in the desired shape under average conditions. We measure the bend by means of inch marks (indelible magic marker) going out from the aft edge of the luff rope at spreader height, and coloured whipping thread stretched from the masthead to the gooseneck with a loop of shock cord at the lower end¹⁰. I'm not good at judging stuff like draft position and sight up the sail using a little plastic gizmo called a Sailscope put out by North Sails as part of their North U. Fast Course which has a grid marked on it (see image below). (I bought a couple of these separately as spares from the North Sails loft in Toronto in the early 90's but am not

⁹ also see the stuff about spreaders, it is easy to let the mast bend too easily which decreases leech tension and kills pointing!

¹⁰ Al Schönborn's note: This system is my own invention: Using indelible black magic marker, put four "inch-marks" on the luff of the sail at spreader height, starting at the luff rope. Fasten about 18-19' of coloured whipping thread to/near the aft edge of the top of the mast. Tie a 6" loop of thin shock cord to the other end. The thread should be of such a length as to put some tension on the thread once the shock cord is looped around the gooseneck or its wingnut. We do this so that the thread runs down the starboard side of the mainsail. With this system, we can adjust mast bend (spreader angle mostly) out on the water before the race(s). We then sail close-hauled on starboard and see which inch-mark the thread passes. In medium airs, our mainsail has its max. draft nicely at 50% aft when we have 2-3" of mast bend. Other sails may be slightly different.



sure if they're still available. The gentleman who designed the whole course is Dave Dellenbaugh who now publishes the "Speed 'n' Smarts" newsletter!



In medium air, angling the spreaders for a shroud to shroud distance of 96,5 cm (38") gives us the desired 5 à 7,5 cm (2-3") of bend when the mast is fully chocked at deck level. It is important to start any adjustment of spreader angle with both spreaders at an equal fore/aft angle. To check that this is so, put the rig under a bit of tension, then stand about 3 à 5 meter (10-15') out the side of your boat while sighting through the two shrouds (with one eye closed). If the spreaders are evenly angled as they should be, the far shroud should remain hidden behind the nearer one all the way from deck to spreader level. If this is not so, one of your spreaders needs to be angled more or the other less. Subsequent spreader angle adjustment is then simply a matter of applying an equal number of (half) turns to each side. I am still looking for a useful way of keeping my wingnuts from coming slowly undone as the day wears on. I have tried heavy elastics but these don't seem to last more than one regatta.

In lighter airs, we want to maintain 5 à 7,5 cm (2-3") of bend but Wayfarers have no obvious means of doing so. Our three main sources of promoting bend will leave us with more ills than the bend cures in the lighter stuff:

- 1 the vang would give us bend but too much leech tension
- 2 cranking in on the mainsheet (upwind) would likewise give us bend but too much leech tension
- 3 cranking up the rig tension would create potential bend the same way you would promote bend in a batten by holding it vertically on the floor and then leaning on it. However, this can only be accomplished by cranking on so much jib halyard tension that all the necessary jib luff sag is gone and your jib luff entry becomes far too flat.

We can, of course, make the mast more willing to bend by angling the spreaders further aft and removing all mast chocks so that minimal rig and sheet tension give us some bend. But what if there is virtually no wind?

What we have done on "Shades" is to install a miniature "take-up tackle" that resembles a tiny Laser vang using 4 mil. pre-stretched rope at the bottom of the forestay. If we're really desperate for bend in those super-light airs, we can then crank up the jib halyard to heavy air tension to put compression forces on the mast. When we push the middle of the mast forward, we now get bend in proportion to the rig tension exerted. We then take up all the slack in the forestay (with our mini-vang) and loosen the jib halyard until we have a nicely curved jib luff entry while the rigging is still tight enough to give the mast ample compression and bend. In the



really light stuff, we have successfully gone with up to 10 cm (4") of bend and no chocks at the front of the mast to give the feeble airs an easier, flatter curve to negotiate.

As the wind increases towards overpowering, the reverse is true. We want to make it tougher for the mast to bend which means spreaders angled further forward (about 1 meter (39") or more from shroud to shroud) and chocks in or the mast will easily bend too much. In the latter case, main leech becomes too floppy and the boat will not point! In survival conditions, the mast will bend 10+ cm (4") even with spreaders angled well forward, once extreme vang is applied (as it should be!). This is something one has to live with, as far as I know. All we can do to help the sail shape is to put on enough of cunningham to remove diagonal folds between mast and boom.

Recommended rake for light and medium airs is 713 à 716 cm (23' 5 to 6") at medium rig tension (about 150 kg (330 lb.)). We measure this with the mast "pinged" (mid-mast bent forward) by hoisting a 7,5 meter (25') tape measure (shackled to main halyard) to the "main fully up" position and taking a reading of the distance to the centre of the traveller at its lower forward edge. For really heavy air, we sometimes move down one hole (about ¼ inch) on our shroud plates to increase the rake and open the slot between main and jib. This means less distance (706 à 709 cm (23' 2 to 3")) between mast tip and traveller/bridle.

- The outhaul is fully extended to the black band only in very light or heavy air. Otherwise, it is off 7,5 à 10 cm (3 to 4") for extra power until backwind becomes a problem.
- The cunningham is used only enough to remove major creases from the luff as the wind starts to blow fairly hard. (Another use we have recently found for the cunningham is to stretch our luff tape which has shrunk over the years, and thus keep the worst wrinkles out of the luff without stretching the luff cloth itself.)
- Mainsheet and vang: Until we get overpowered, we use no vang when close-hauled. We sheet in until the upper leech tucker begins to get sucked in behind the main - even a bit more once we have good speed up in fairly flat water (like going into second gear!). Once we get overpowered, we use increasing amounts of vang and sheet in as far as we can without putting excessive heel (=helm) on the boat.
- Leech tucker: On our main, we use just one 15 cm (6") wind tuft, on the leech at about 3/4 height. Made of wool to ensure continued function even in rain, it is attached by threading the wool through a needle and putting a Figure 8 knot in the long end. We then slide the needle inside the fold of cloth at the leech, letting the needle come out the aft end. Pull through until the stopper knot is wedged safely inside the fold where it will not catch the rest of the tucker.

Lower mast bend can be partly limited by inserting wooden shims/chocks between the front of the mast and the slot in the foredeck. Encourage mast bend in light air and heavy air (no shims). Discourage lower mast bend in medium air by inserting some shims.

Pressure from the shims usually will damage the front of the mast. This can be avoided by installing a protective sleeve around the mast. The aluminum sleeve should extend from say 5 à 7,5 cm (2 or 3") above the deck down to say 20 cm (8") below the deck level. Such a sleeve is available from Proctor Masts. It redistributes the force over a wider area thus eliminating damage to the mast. Lower mast bend can also be limited by installing a U-shaped channel under the mast step. As the mast bends, the foot travels aft along the channel. This travel can be limited by a bolt through the U channel. The amount of travel to allow is controversial. Currently, I allow a max. of about 3,8 cm (1½") of movement at the foot of the mast.

1.2.6 miscellaneous mast issues

- Always use a mast head fly to help show the wind direction. Tape to the top of the mast with duct tape. Extend as far above the mast as practical for clear air.



- Install shims between the sides of the mast and the opening through the deck as well as on the vertical supports just below the mast pivot bolt. These shims help keep the mast from bending sideways. Wood or plastic is fine or even use rubber from a hockey puck.
- Install a large ring on the front of the mast for hooking on the spinnaker pole. It makes it much easier to connect and disconnect.
- File fine notches in the main and jib halyard blocks and lubricate them regularly to insure that they turn freely under the loads imposed by the wire halyards.
- Install strips of black electrical tape where specified by the class rules on the mast and the boom. This will show the maximum allowable positions of the corners of the sails.

1.3 Mainsail control, shape and trim

1.3.1 The main halyard

The main (and jib) halyard should be made such that when the sail is fully raised, the supporting part of the halyard (between the shackle at the sail head and the point where it is fastened) is wire, suggested wire:

- main halyard: about 6,71 meter (22') of 3/32" 7 x 19 stainless steel wire (more than 6,70 m. (22') if your halyard exits at the foot of the mast!)
- jib halyard: about 6,40 meter (21') of 1/8" 7 x 19 stainless steel wire (more than 6,40 m. (21') if your halyard exits at the foot of the mast!)

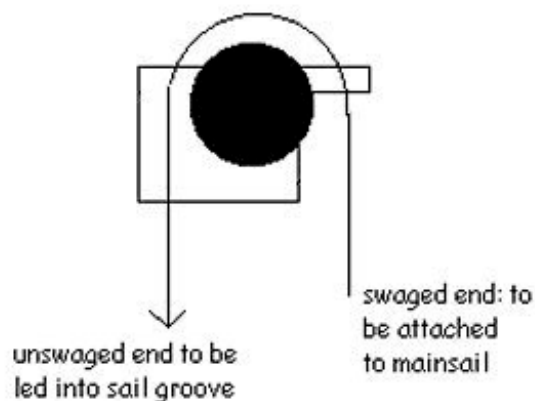
A thin (#4 Dacron braid) rope tail is added only to enable the wire to be pulled into the correct position where it can be hooked onto:

- a halyard rack for the main
- a highfield lever or magic (purchase/muscle) box for the jib.

This leads to well set sails (less stretch in wire) and does away with the need for cleats on the side of the mast (which are always catching things when you least need it!). When rigged this way, both main and jib halyards bypass the double block that came with the older-style Proctor masts about one and a half feet below the gooseneck. Instead, they come down the mast groove past the gooseneck and hook onto their rack, lever or magic box hook just below the gooseneck. This saves wire and the aggravation of trying to pull a swaged loop past the sheave in the block.

Installation:

- 1 Swage a loop lined with a thimble into one end of your new 3/32" halyard wire
- 2 With the mast down, feed the unswaged end of the wire through the sheave box at the mast head as indicated below:





- 3 Now you can often just lay the wire part into the sail groove. If it does not go in easily, take a screw driver and gently wedge the two sides of the sail groove apart and let the wire fall in.
- 4 Put your mainhead shackle into its swaged loop and have a helper hold it in the 'main full up position', i.e. such that the shackle pin is about 1,3 cm (1/2") below the lower edge of the black band.
- 5 Gently tension the wire and lightly 'kink' it around the middle hook of your halyard rack to mark the correct position of your loop.
- 6 Cut off excess wire, leaving enough to accommodate a 10 cm (4") loop which you will now create by swaging.
- 7 If you use #4 Dacron braid line (cheap!!!) as a halyard tail, you can simply tie this onto the 10 cm (4") loop with a bowline. #4 line runs nicely, even up the mainsail groove, and if its thinness makes you nervous, soak the part where rope meets wire with 5-minute epoxy glue to keep the #4 line from fraying too easily. You'll need less than 7,60 m. (25') of this line. My apologies for not knowing more precise dimensions!
- 8 Now pull the swaged loop down near deck level and stow the main halyard as usual.

If you already have the right halyard but wish to add a halyard rack

Raise the mainsail until it is in perfect position (sail head at lower edge of upper black band). Mark the location of the lowest part of the wire loop attached to the tail. The middle hook of your rack should be at the level of this mark. The rack may be riveted onto the side of the mast groove (I prefer the port side) or you can make the system neater by removing about six inches of mast groove in the appropriate location and riveting straight onto the aft face of the mast. There is some question though as to how legal the latter is under the Class Rules nowadays. Once the rack is riveted onto the mast, check again to see which hook should be used so that your sail head is right at the black band. As long as you continue to use the same sail, shackle and halyard, your sail will now be in perfect position each time you hook the lower loop onto the appropriate hook.

You can install a Velcro loop on one side of the mast support to hold the folded rope halyard. Keep the boom free of the goose-neck while hoisting. then attach it. Avoid stretching the luff of the main. It should have tiny horizontal "speed-wrinkles" extending out from the luff to maximize power from the main.

1.3.2 Boom vang/kicker

Both lever vang and block & tackle arrangements can make effective vangs. A minimum of 8:1 or 12:1 advantage is needed for good control. Since the vang is the primary control of mainsail shape, it must be easily adjustable from either side of the boat while you are hiked out. Run a control line under the thwart to each side deck where it can be adjusted and cleated on the vertical edge of the side deck¹¹.

In light to medium wind, very little vang tension is needed going to windward. The prime indicator is the upper batten. The back 6 inches of it must be parallel to the boom. Too much vang will tighten the leach causing this batten to hook to windward. This chokes the air flow over the main. Too little vang will leave the leach too loose. This puts too much twist in the main making it hard to point. Although it is common to go to windward with little vang tension in light to medium winds, it is necessary to apply some vang on reaches and runs to prevent the main from twisting off too much, thus spilling wind from the upper section.

Another indicator for proper vang tension is the luff of the main. With proper vang tension, it should luff evenly from top to bottom. If the vang is too loose, the upper section of the main will

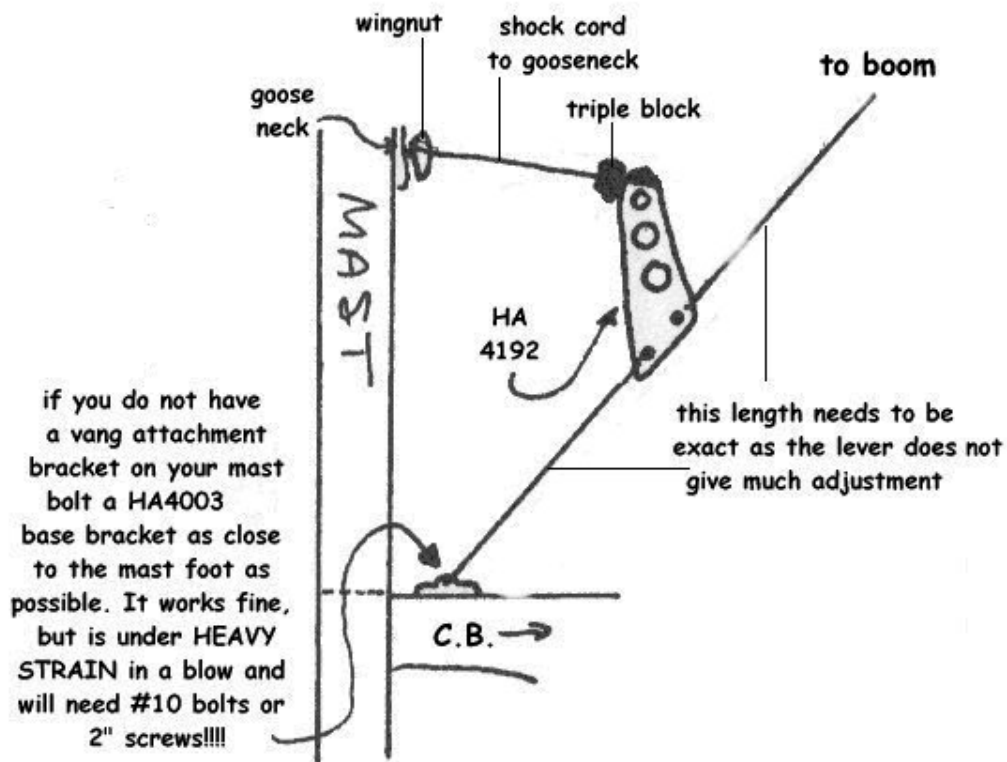
¹¹ Al's note: or on the aft edge of the thwart).



be too full. Hence it will luff first. If the vang is too tight the upper section of the main will luff after the lower part.

In heavy air, the vang is used to flatten the main thus depowering it so as to be able to sail the boat flat. On reaches where the power can be used for more planing speed, it is possible to ease the vang slightly. This also helps to avoid a capsize by keeping the boom from hitting the water as easily.

Both boom vang and outhaul are often controlled both at the main thwart, six inches to port and to starboard of the centreboard box. The vang and outhaul are both set up for easy adjustment with lots of mechanical advantage. This involves mounting a number of blocks on both sides and looks complicated but it functions beautifully once the initial aggravation of the installation is over.



Boom Vang installation

We use a lever vang and the key item for its success is to ensure that the length of the wire-lever-wire unit shown above is correct for your boat.

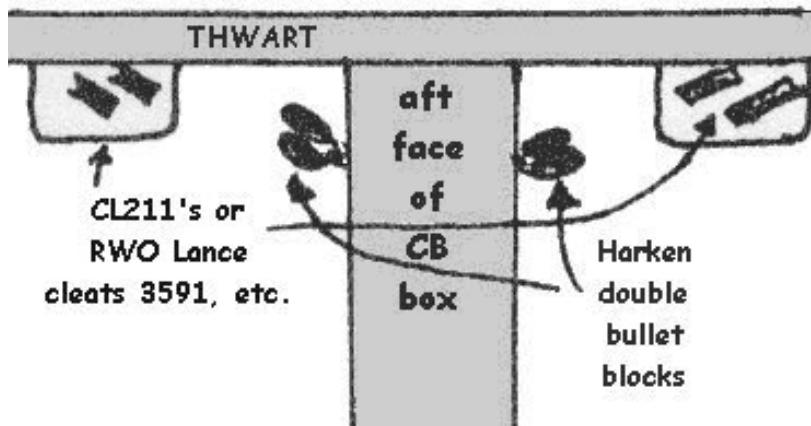
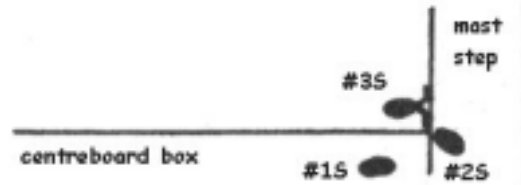
To determine what the exact maximum length should be, hoist the main into its proper position on a calm day. Hold the boom over the centre of the transom with no downward pressure. Now measure the length of the necessary wire-lever-wire unit that is to go between the shackle at the foot of the mast attachment point and the boom attachment point. (If you have a moveable boom attachment point, this length is less crucial, since you can move the boom adjustment as necessary). If this unit turns out too short, you will need to extend it with shackle(s) or whatever you can think of. Otherwise, your vang will be too tight for light air sailing. If, on the other hand, it is too long, the vang will not be effective enough for a good blow.

Lever controls



Our lever is a HA 4192. It is double-sided and has a U-shape when viewed from above. We shackle a triple block to the top corner of the lever. Where the shackle pin passes through the "U" we insert one loop of a 6mm (¼")-shockcord (about 35 cm (12") long with [seized] loops at each end). The other loop goes over the wingnut on the gooseneck to keep the lever from flopping sideways too much. The triple block meanwhile, requires four additional blocks: one on each side of the mast step and one on each side of the centreboard box.

The diagram to the right shows the starboard side arrangement (plus block 2S which will be used for the outhaul control line). The port side is a mirror image of this arrangement.



The diagram above shows the set-up as both vang and outhaul controls reach their cleats on the aft edge of both sides of the thwart. The double blocks should have their eye straps slightly aft of the thwart along the upper part of the CB box such that the control line under tension will leave the block about 3 mm (1/8") aft of the thwart. This results in a smooth entry into the clam cleat (CL 211) (or the Lance cleat which I now prefer). The CL 211's are mounted on the aft face of the thwart (or a six inch piece of 2 x 4 placed under aft edge of a wood thwart). The cleats should angle slightly up from horizontal to conform to the angle of the rope coming up from the double block to the cleat.

Threading the vang control line: We use 5 mm. soft-braid about 6 meter. (20'). Take one end of the line and feed it out through the upper clam cleat on the starboard side. Tie a figure eight knot and leave six inches of loose end for better grip in emergency. Take the unknotted end and feed it through the upper sheave of the double block and forward under the thwart along the CB box. Up through cheek block 1S and through the starboard sheave of the triple block on the lever. Down through 3S and back up through middle sheave of the triple block, down to the port counterpart of 3S, up through the port sheave of the triple block, down to the port counterpart of 1S, back along the CB box, under thwart, into the upper sheave of the port double block and out through the upper clam cleat. Finish with Figure Eight knot and leave six inches of loose end.

Vang needs:

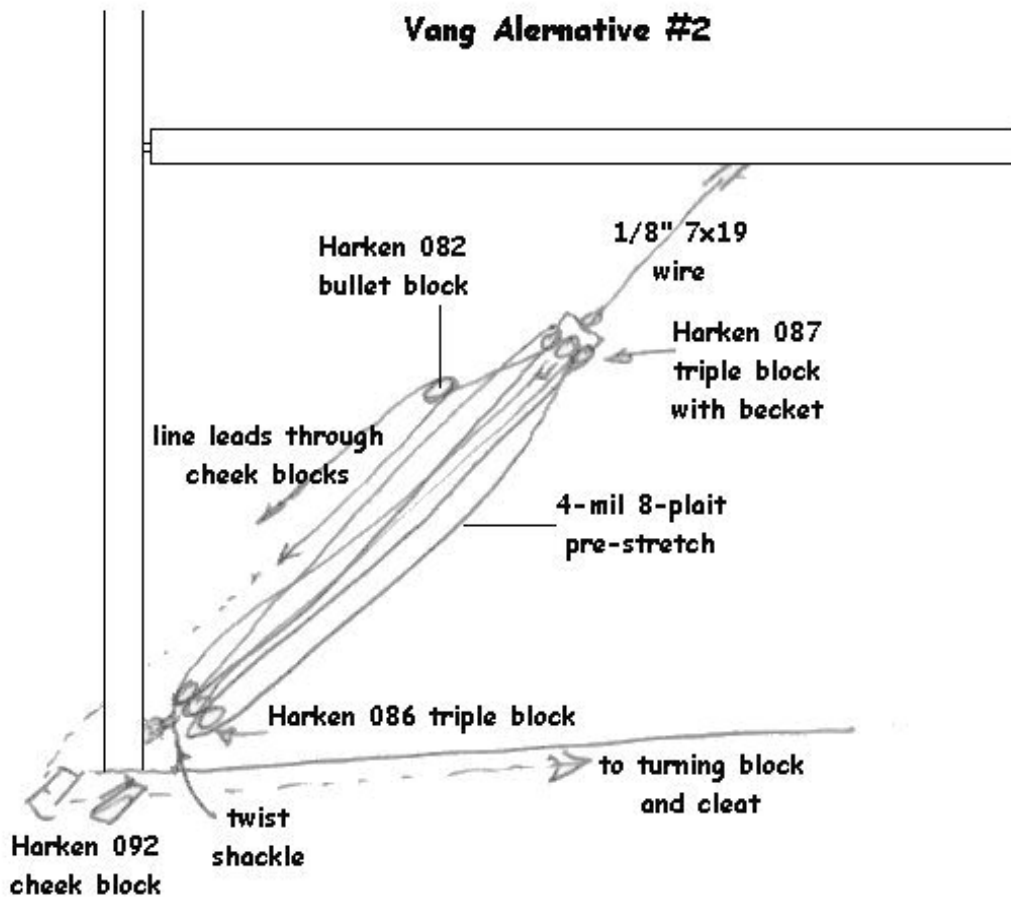
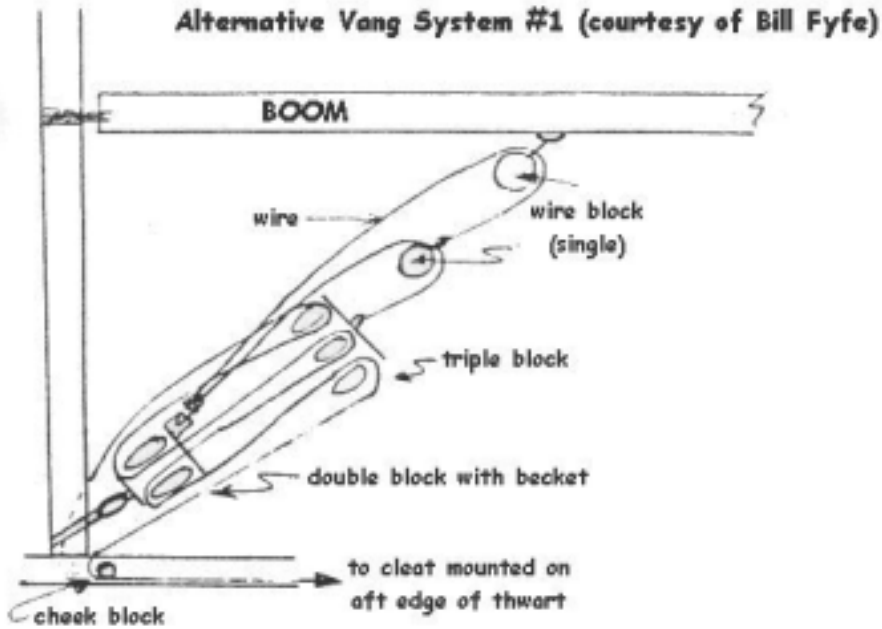
- one lever HA 4192 plus prepared wires at each end
- one triple block with shackle and looped shock cord
- two double blocks, cheek blocks, bullet blocks, CL 211 clam cleats (or RWO Lance cleats)
- four eye straps
- all screws



- 6 meter (20') of 5 mm soft-braid

Vang/Kicker Alternatives

If you don't like the thought of levers, there are some good, quite powerful alternatives such as the two shown below:



1.3.3 Boom outhaul

Function of the outhaul

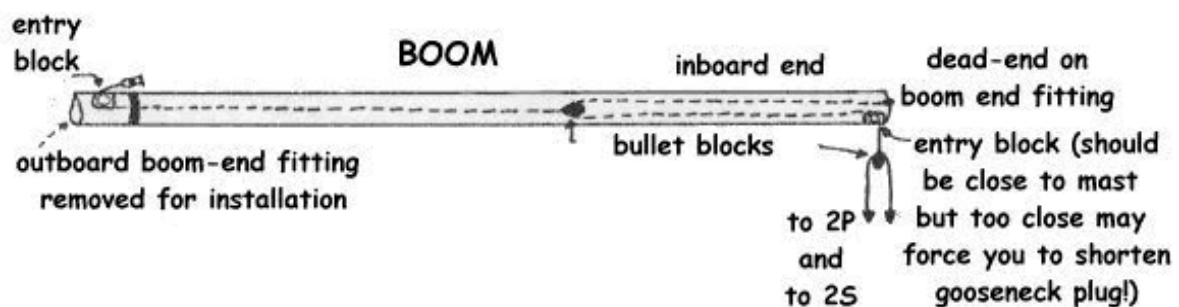
Set up the outhaul so that it is easily adjustable while sailing. Run control lines back under the thwart (or along the side of the CB housing) but preferably to each side deck for adjustment while sailing. A 3:1 or 4:1 purchase is effective.

- In light wind, pull the clew of the main out close to the black-band to flatten the sail, this helps to maintain air flow over the sail. A tight outhaul also helps to loosen the leach of the main. It is OK if the foot of the main folds into a shelf. This is necessary to flatten the sail.
- In medium air, ease the outhaul to make the sail full for max. power. Just take out the vertical wrinkles along the foot.
- In heavy air, pull the clew out to the black band to flatten (depower) the main when going to windward. Ease the outhaul on reaches to provide increased power for planing.

With the current trend towards close sheeting genoas, the ability to adjust tension along the foot of the mainsail so that the bottom section of the sail can be flattened to keep the slot open is an important control. In fact, it is all too easy to overflatten the bottom of the sail. So, initially have the foot fuller than you think is necessary. Then, as the front of the sail backwinds, flatten progressively until there is as little backwind as possible. This also gives the advantage of opening out the lower leech to reduce heeling forces. In simple terms therefore, when beating in light weather, the foot should be as tight as possible with horizontal ridges. As soon as the crew sits on deck, the sail should be eased about 4 cm (1½") to give some backwinding but not too much. Then, as the helmsman has to progressively ease the main sheet, the foot should be tensioned gradually to cut down the heeling moment. Do remember however, that if there isn't power in the rig to drive through waves, it pays to have the foot fuller and to accept the backwinding. Finally, mark the control line where it leaves the boom to show the amount of tension applied, and lead it back to the helmsman.

Outhaul Installation

You will need a swaging tool for this (or you could use pre-stretched rope instead of wire).



The inboard and outboard endplates will have to come off the boom. You will probably already have an entry block at the aft end of the boom, but for this system, you will also need a (small!) entry block on the underside of the boom at its inboard end. I used a HA-6 for this and put it so close to the inboard end of the boom that I had a nasty surprise when I tried out my new system: the gooseneck plug would no longer fit into the boom! I got around that problem by hack-sawing off most of the plug which is now about 2 cm. long (and it has worked fine for the past 20 years!). In retrospect, I like this system because it leaves the outhaul system nice and close to the mast so that the outhaul is not visibly tightened when I let the boom out to a reach or run - which it would be if I moved the entry block too far aft! A really small entry block



moved aft a bit might avoid the entire problem, I think. Get the second entry block ready to be installed but do not rivet it in until its rope or wire is in place.

Deal with the aft part first! If you already have a wire outhaul, you may be able to use this. Otherwise, get about 3 metres (10') of 2 mm 7x19 stainless steel halyard wire, and thread it through the entry block at the aft end of the boom. If you want to reduce the risk of shackle loss, do a fairly tight swaging around the outhaul shackle with the wire end that comes out of the boom. Once you have done this, feed the other end towards the inboard end of the boom. There is a large amount of leeway in its length, the only limit being that it must not be too long. When you stretch the outhaul to its maximum tightness position, the "floating" bullet block inside the boom must still be aft of the entry block at the inboard end, or you will not be able to get full tightness from your outhaul. Once you have the wire at a correct length, drag it out the outboard boom end and swage the bullet block onto its end.

On "Shades", we use 4 mm pre-stretch for the rest of this set-up. Assuming you have made your wire the max. length, you will need only a metre or less of 4 mm pre-stretch for the other "inside-the-boom" part. Using a small bowline, deadend one end of this line to the inboard end plate of the boom (while it is off the boom!) If you have someone with small, agile hands, you may be able to reach the floating block and thread the 4 mm through it. But most likely, you'll need to do what I did: Pull the floating block and its wire out the outboard end of the boom. Then take a 6 meter (20') scrap of thin line and connect it to the 4 mm by means of duct tape. Thread this through the boom (inboard to outboard) and then through the floating block. If you have near max. wire length, you can merely tie a good long bowline around the sheave of the block and pull the whole mess back to the inboard end where you can untie the bowline and proceed to pull on the scrap line until it in turn pulls your 4 mm through the floating block. If your scrap line or wire is too short for this, you need to feed the loose end you've pulled through the floating block, back to the inboard end of the boom (which can be done but is more of an effort!) Now detach the scrap line from the 4 mm and thread the latter through the inboard entry block.

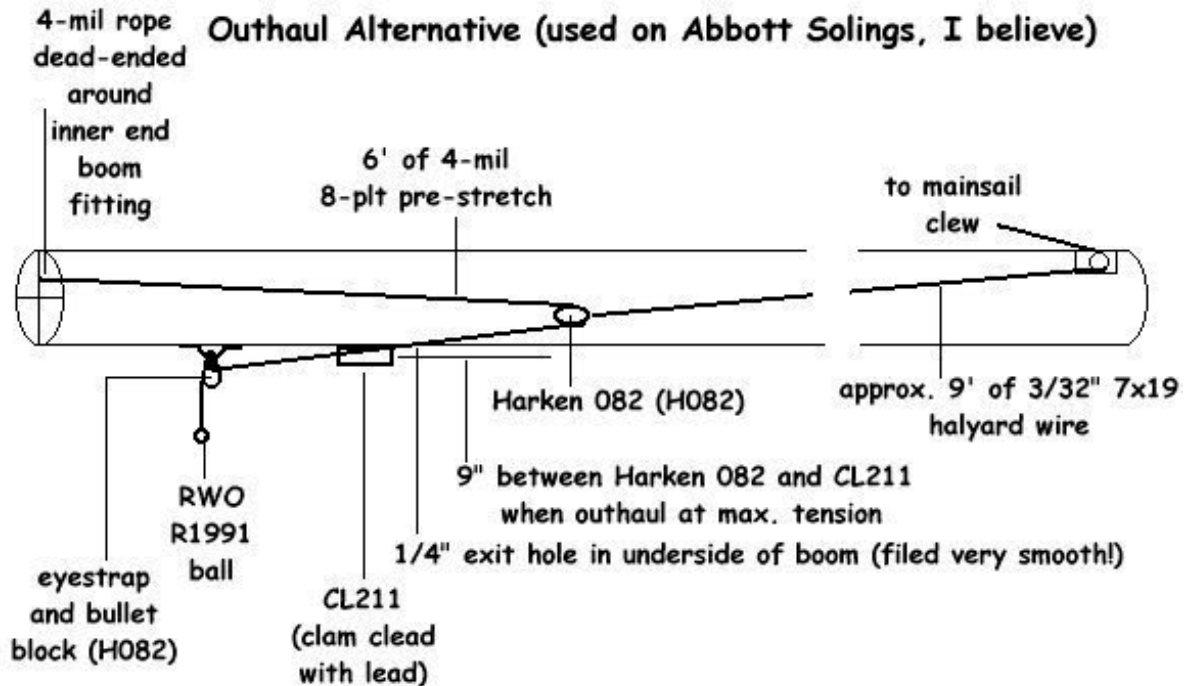
You will be tying another bullet block to the end that emerges from the entry block. Here the limiting factor is two-fold:

- 1 you don't want any more rope than necessary hanging out of the boom here but
- 2 there must be enough rope to permit easing the outhaul as much as you will ever want to

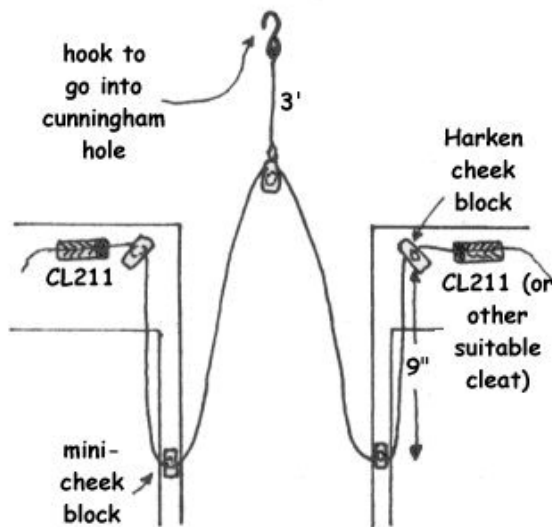
In my opinion, the rope hanging down from the front of the boom should be about 45 cm (18") long outside the boom when the main clew is pulled out to its maximum outermost point. The block attached to the end of this rope is the mid-point of the outhaul control line system: feed the control line through and then thread the starboard side loose end through 2S (see vang diagram) and then aft along centreboard box, through the lower sheave of double cleat at thwart (below vang control) and then out through the lower CL 211. Finish with Fig. 8 and six inches of loose end. Do likewise on the port side. On "Shades", the outhaul control line is about 4,50 meter (15') of 5 mm soft-braid.

Outhaul Alternative

I believe the system shown below is copied from an Abbott Soling. It is nicely self-contained and can easily be operated by the crew who tightens the outhaul by pulling on the rope end with the ball that hangs down. Of course, as with all outhauls, it becomes difficult/impossible to tighten in proportion to the amount of wind and vang pressure being exerted on the mainsail! To uncleat and loosen the outhaul, the crew reaches between the bullet block and the cleat, grabs the rope and pulls it out of the cleat:



1.3.4 Main cunningham



Our Cunningham system has only one feature that not everyone uses. We attach a small S-hook to about 90 cm (3') of 4 mm pre-stretched line and tie a bullet block (with a bowline) to the other end. The control line then passes through this block as shown in the diagram. This saves dismantling the system when the sail comes off the mast.

Installation: Two cheek blocks (Harken 092) go just below deck level on each side (i.e. one on each the deck of the overhang beside the mast step).

About two inches out from each of these, we put a silver clam cleat with eye (CL 211) or a Lance cleat. The second pair of cheek blocks, mounted as shown on the mast supports, need to be smaller, and we've used mini-cheekblocks. The 5 mm soft braid control line about 275 cm (9') long) is threaded in as shown. Figure-Eight knots go onto each end, of course, with 15 cm (6") of loose end for better grip.

Note: If you do not use the short extra rope with the S-hook that hooks into the cunningham hole (about one foot up from the tack along the luff), you have to undo half the control system each time the sail leaves the boat.



Some sailors say that there is very little need for a cunningham. It is designed to pull mainsail draft forward – usually when a good breeze has blown the draft aft while you are close-hauled. It takes creases out of the luff of the main when extreme mast bend has left the sail "luff-starved". In light to medium airs, it is generally best to leave small horizontal "speed wrinkles" along the luff of the main. Only use the cunningham upwind in heavy air to help flatten the main.

1.3.5 The bridle

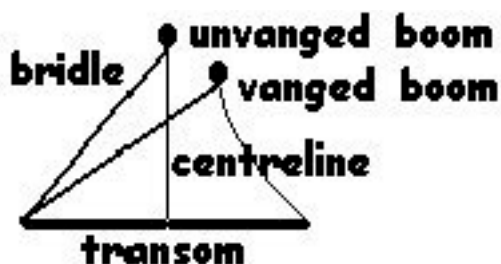
The bridle moves the transom block from the mainsheet arrangement closer to the boom. The closer we bring the transom block to the boom block, the less downward pressure on the leech will be exerted as we centre the boom for better pointing.

Simple bridles are now popular in place of a traveller car. The advantage of the bridle is that the main sheet tension acts primarily to adjust the inboard/outboard angle of the boom. Downward tension on the leech of the main is minimized. Leech tension is then left primarily to be controlled by boom vang tension. A double block arrangement is used, similar to a Laser to allow free travel along the bridle¹². Some racers switch from a bridle to a traveller for strong wind conditions. The only advantage of the traveller arrangement is that it can be let out to the corner in strong winds. This keeps the main flat while spilling air to help keep the boat level. With this set up, a strong crew can play the traveller to compensate for gusts. For this reason it is important to have the control lines lead back to the thwart where they can be easily adjusted while hiked going to windward.

It is critical not to oversheet the main when going to windward. Watch the tell-tale on the leech of the main and try to keep it streaming back¹³. If this is difficult (i.e. it tends to loop around behind the main), there may be too much boom vang tension. If the tell-tale loops around in front of the main, there may be too little vang tension.

As the wind dies, it is very important to ease the mainsheet. (When in doubt, let it out!) In very light air, the boom must be out 5 cm (2'), or more, to leeward of the center line of the transom.

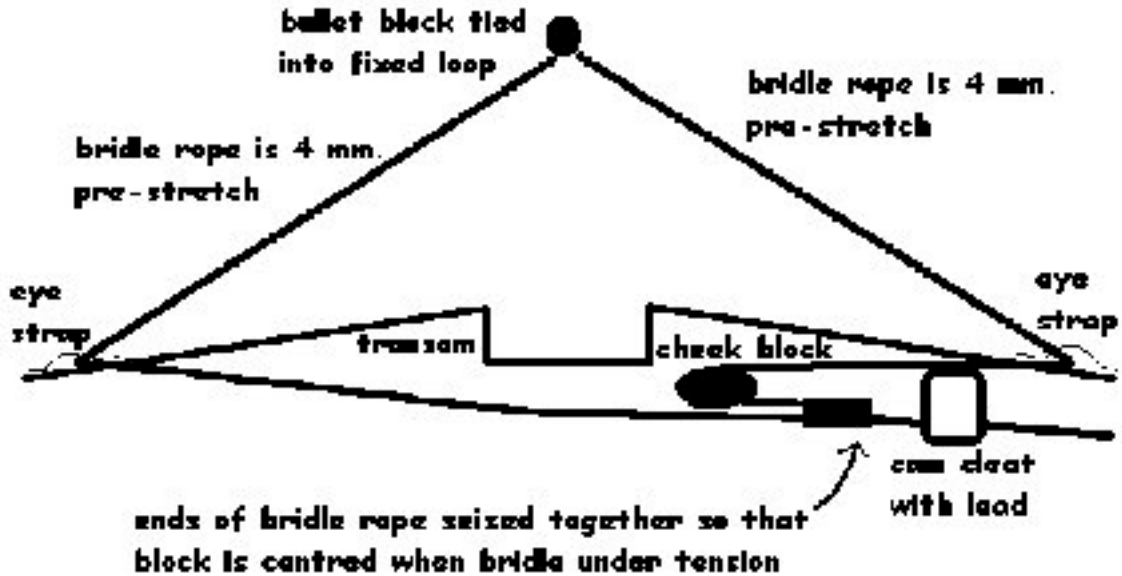
The transom block must not be raised so much that the transom and boom blocks meet before adequate tension for the conditions can be exerted on the mainsail leech, i.e. those two blocks should never actually meet. If they do meet while the main leech tacker is still flying freely, the main leech is not doing enough for your pointing. Thus, you either have to live with too little leech tension or you will have to use the vang to create the desired leech tension. But if you do use the vang, the boom end will come closer to the transom and the bridle will be even more too long which prevents you from centering the boom (see diagram below).



¹² Al Schönborn's note: These days, most people use a single block tied to the bridle. This makes it easier to keep the boom centred.)

¹³ Al Schönborn's note: Don't overdo this, however! If you want to point, the leech tacker should spend up to half of its time disappearing behind the main once your boat is up to optimum upwind speed!

Remember that you will point better in proportion to how hard you can sheet in your main! Once you are up to good speed, you can even go past the optimum point shown by your leech tickers and hook your top batten slightly to windward of its usual recommended parallel to the centreline position upwind, but you must be very aware of any loss of speed. Should you suspect that this is occurring, you should sheet out and get your speed up again immediately.



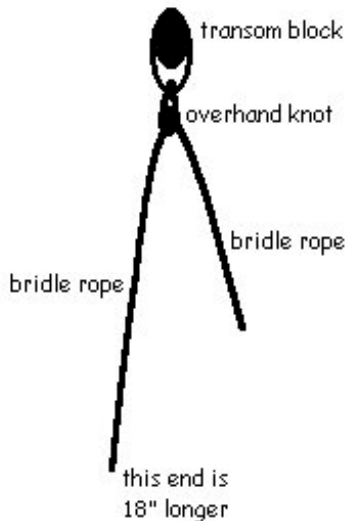
The adjustable system shown above was invented by Steen Ammentorp. It requires about 4,5 meter (15') of 4 mm pre-stretch plus two eye straps, one cheek block and one cam cleat with a lead. To better illustrate the system, I have included a pair of photos of Jesper Friis' W9355 "Whistle":





Installation

The distance between the cheek block and the cleat is limited! To get the correct length of bridle, raise your main ashore on a calm day and centre the boom without vang or excessive downward pull on the boom. Feed the 4,5 meter (15') of bridle rope through your mainsheet transom block and tie in by doubling the line and tying the block with an overhand knot (i.e. half a reef knot!) such that one side of the line is about 45 cm (18") longer than the other (*see figure below*).



Your two mainsheet blocks should almost meet when the seizing hits the cheek block, i.e. when the bridle is at its loosest position. The bridle should be stretched almost flat along the transom when you have pulled the seizing around the two ends as close as possible to the cam cleat.

Note: This is not a system that is easily adjusted while there is any pressure on the mainsheet. We have at least once had the bridle rope accidentally become uncleated while going upwind and had to wait for the run to reset it!

1.3.6 The mainsheet¹⁴

The main sheet should be approx. 11 à 12 meter (35' to 40') long and made from 6 à 8 mm (1/4 or 5/16") braided line. Fasten the mainsheet to an eyestay at the end of the boom. Then lead it down to a block on the traveller, or bridle, back up to a block on the boom so as to provide a 2 to 1 advantage¹⁵. Tie a knot in the main sheet so that the boom will only touch the shroud as the knot hits the main block. This will prevent damage to the boom or shrouds when gybing in high winds. Put tape on the boom where it touches the shrouds to help prevent chafe on the wire and the boom.

Aboard "Shades", we have used a number of different mainsheeting systems, and I must say that I think the current system that we've been using for the past three years (see photo below) seems to be pretty well flawless for our needs.



You may be able to see that we use a(n adjustable) bridle with 11 meter (36') of 5 mm softbraid for a mainsheet. This "new" mainsheet was once part of a very old spi sheet that was pressed into service at this year's Nationals. When our 8 mm braided rope being just a bit too short finally annoyed me enough, I took it out of the swivel cleat for a run and then rushed to re-thread it for a rapidly approaching beat. It was a close race with only half a beat to the finish, and a bad time to discover that I had (inadvertently!) installed a new barber hauler for the starboard jib sheet!

Well, I was not going to repeat that manoeuvre! So - during our on-the-water lunch, I rummaged about in the aft tank (which still had not quite returned to normal after Mike Mac had totally emptied it just to sail one club race at TS&CC!) and found our old 17,5 meter (58') continuous spi sheet from before the days of the "balls system". It was in there to comply with the 7,5 meter

¹⁴ By Al Schönborn

¹⁵ Al Schönborn's note: Then lead it forward through a stationary eye on the bottom of the boom about 3' forward of the boom end [garrotte preventer during gybes!], and on to a block on the boom that will be directly above your centre mainsheet swivel block when you are sheeted in.)

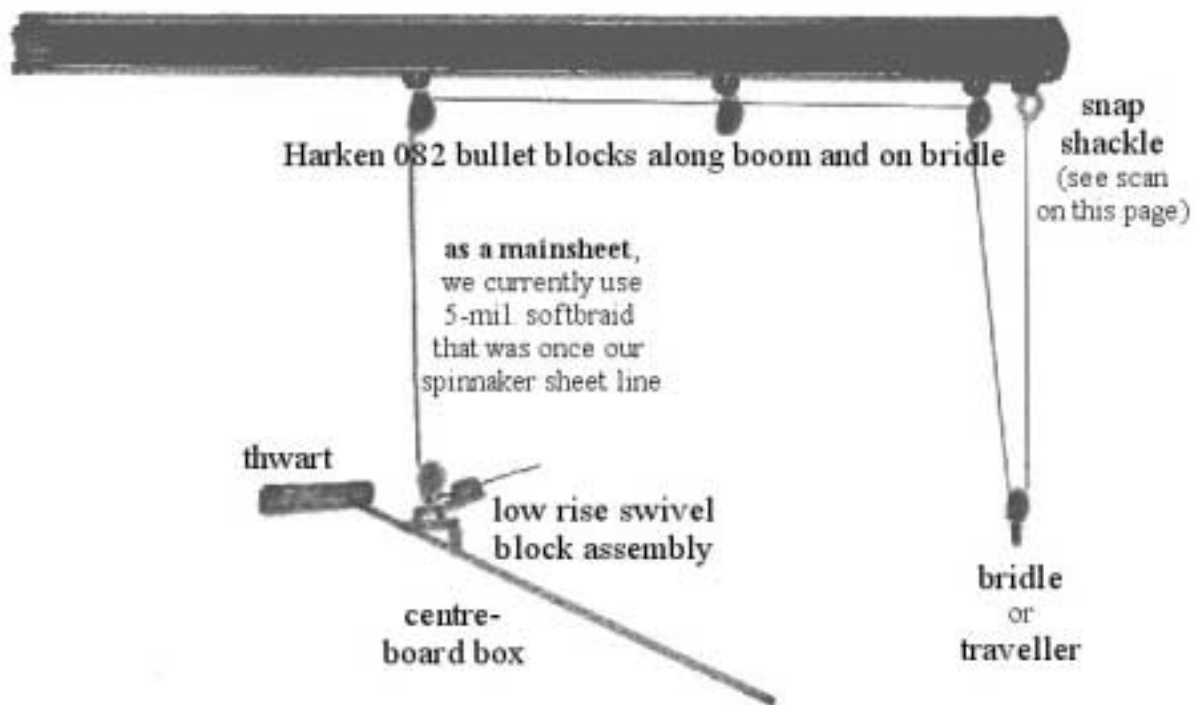


(25') towing line requirement plus it could be pressed into service if our somewhat frayed spi sheets gave up the ghost. And now it developed a third function: it was threaded in as a new mainsheet, tested for length with the bridle pulled as flat as it goes and the vang off. Then I left an extra two feet of rope just in case I had overlooked some possibility - and ended up with a mainsheet that is 11 meter (36') long.

Using a sheet that is no more than 8 mm in diameter (preferably less!) not only makes your sheet cheaper to buy, it also enables you to use Harken (082) bullet blocks instead of larger, heavier, more expensive boom and traveller blocks. We have the kind of boom that has slides with U-brackets on its underside which means we have to use twist shackles to attach the bullet blocks to the U-brackets so that the blocks will face fore-and-aft as opposed to sideways. The block in the middle doesn't really bear any load and we have replaced it with a tiny shackle which still keeps the mainsheet off my throat as we gybe!

Note: If you don't have a boom that can use the slides, you can use eye-straps (without shackles if you fasten the eye-straps with the Harken 082 already threaded in) but make sure you use strong (stainless steel or Monel) rivets or #8 half-inch self-tapping screws (with the points filed off to avoid snagging on any outhaul ropes that may run inside the boom) since these eye-straps will bear a fairly heavy load!

With apologies for my atrocious art work, the diagram below shows our system:





We used to use a block with a becket at the end of the boom - which required one less slide - but I find I prefer the system diagrammed above with the end system that I just finished laying onto my scanner with the result at left:

You can probably see how thin that sheet is - it doesn't bother my hands but then I

- have fairly tough hands
- cleat and uncleat the mainsheet hundreds of times per race

The snap shackle is fairly permanently attached to the aftermost U-bracket on the boom but in last year's drifters on the Sunday of the Midwinters, it was nice to be able to unsnap it from the boom.

This takes one purchase and a lot of rope pulling out of the system for places such as the leeward mark! And a thin sheet runs much more freely through its blocks, which faster and sometimes safer!

The Swivel Block & Cleat Assembly

As luck would have it, I inherited what I believe to be the perfect swivel block assembly. Made by Barton, it has a short, low-rise plate that attaches the metal cam cleat to its base. Much as I love Harken stuff of almost every description, I have dumped at least twice when using a borrowed boat that had their standard high-rise swivel cleat. The problem was that, during a tack, the sheet cleated itself on the Harken swivel whereas my Barton swivel takes a conscious effort to cleat - i.e. I have to reach down, or push on the sheet with one foot, to make it cleat. I find this easier to do than to explain, and for me, it is certainly much safer (and drier!) I believe the glass boats tend to come with a spot provided for the swivel mount at the aft end of the centreboard box. If I had a glass boat, I would not use this location since it's too low for my taste. And above all, it's too far aft - considering that I go aft of the mainsheet each time I tack, and that the further aft I go, the more transom drag I get.

1.3.7 Mainsail shape and trim¹⁶

The mainsail has a very important role to play in the development of power from the whole rig. This stems not only from its function as the windward part of the slot between genoa and main, but also from its sheer size. Correct setting up and control are therefore necessary to get the most speed out of the sail. Particular care has to be taken with the mainsheet tension because it is very easy to oversheet and stall the air flow coming off the leech. This usually occurs when beating or reaching. So do remember that as the air flows over the sail's windward and leeward surfaces, it forms a pressure gradient which creates a leeward going force at right angles to the sail's surface. Obviously the bulk of this force is in the leeward front sections of the sail, but if the leech is too tight, some of it will actually be facing backwards to create drag. This not only decreases forward movement but increases sideways and heeling forces. In such a case, the leeward air will refuse to conform to the sail's exit curve. As the lee-ward air flow breaks away, the sail stalls, resulting in a dramatic loss of power and speed. This explains that sudden loss of speed in fluky or gusty conditions when the sail cannot cope with the variations in the speed of the air flowing across it, and it explains why rigs must be capable of adjustment.

¹⁶ slightly spiffed-up version of an article that Mike McNamara wrote for the May 1990 Whiffle



The golden rule for setting the Wayfarer mainsail is that the sail will be set correctly if the aft 15 cm (6") or so of the top batten and the last two feet of the boom are parallel. As everything else is subservient to this essential condition, the sailors have to organize mast bend as well as sheet, vang and foot tension to suit. The sail should therefore be set up to have the proper shape in middle wind conditions with rig variations built in to enable to sail to adjust to lighter and heavier winds.

Force 2 -3 (4 - 10 knots) is about the optimum. It is in those conditions that most crews will be sitting to windward without being over- or under-powered, and the sail should be at its fullest in these conditions. As the wind rises, the sail has to be flattened - or more correctly, feathered - to reduce the heeling force. As the wind drops, the sail has to be flattened again, albeit in a different way, for the weak, slow moving air tires as it flows over the sail. The way to flatten the sail in either condition is to make it wider by bending the mast. This drags fullness from the body of the sail. Obviously, this flattening must not be done too early so that the sail loses power and the crew have to sit in, or too late so that the boat heels over and slows down. In simple terms, if you are having to spill wind earlier than other boats with similar crew weights, and if you are very, very fast off the wind, yet very slow to windward, then your mast is probably not bending enough. If, on the other hand, you are not sitting out as early, or are going very slowly off the wind, then your mast is likely bending too much. The aim has to be to get both helm and crew sitting out as soon as is possible, whilst delaying by as much as possible, the moment when the helm has to start feathering the mainsail.

In force 2-3 (5-10 knots), a mast rake of 715 à 717,5 cm (23'5½" to 23'6½") is recommended. This is measured (onshore) in the straight line from the masthead black band to the centre of the main sheet traveller (its lower forward edge). There should also be 150 à 160 kg (330-350lb) of rig tension on the windward shroud¹⁷.

As the wind increases, the rake will need to be increased (i.e. distance between black band and traveller shortened!) to make it easier to keep the boat tramping fast. This technique has been incredibly successful in the Olympic classes, and is now being increasingly used in all classes. The reasons for its success are rather obscure, but could include opening the slot between genoa and mainsail, making the leech of the remain more open, and making the leech of the main more vertical. Whatever the reason, it works - particularly for light weight crews. Care has obviously to be taken not to overdo things, because on the Wayfarer, increased rake has to be pre-set by moving the lower end of your shrouds down 1-2 holes in your shroud plates. The trouble is of course, that if the wind drops and you have extra rake, you will go more slowly.

To sum up, if the wind is going to be strong, reducing the distance from black band to traveller by 2-4" can help enormously. Rig tension should also be increased to something like 157,5 à 162,5

¹⁷ Al Schönborn's note: The mast needs to be pinged into its pre-bend position before this measurement is taken - see paragraph on pre-bend later in this part of the article. On W3854, we simply measure the rake by :

- 1 hoisting the jib and tensioning the rig for medium winds
- 1 pinging the mast, if necessary
- 1 attaching the main halyard shackle to the end of a tape measure and then pulling up the main halyard until it is in the position where the top of the main would just reach the black band - on our boat, this is hook #3 on the halyard rack
- 1 stretch tape measure to forward underside edge of centre of traveller (or its equivalent)



kg (350-360 lb). By the same token, increasing the distance by 2 to 5 cm (1-2") and decreasing rig tension to 135 à 150 kg (300-330 lb.) as the wind gets lighter gives a better feel to the boat.

It is obviously important to make sure that the mast is actually upright and as near the centre line as possible. If it is not, the slot between genoa and main will vary, the spreaders will be hard to organize, and the shrouds will have differing tensions. Measure to each corner of the transom from the mast head by tying a tape measure onto the main halyard. Also check the distances to the shroud anchorages. If the top of the mast is leaning one way or the other, then the mast gate has to be adjusted as a last resort. Once the mast is vertical and straight, move on to controlling the bend. The basic principle is that once the spline (vertical) strength of the mast has been overcome, it will start to bend and very little extra load is needed to keep it bending. Thus, bend is not that difficult to organize.

Mast bend

The mast needs to be bent in light winds, then straighter in middle airs (to make the crew work hard), and finally the mast has to bend again as the main sheet is eased to feather the main. This time of course, it has to act as a spring in the system so that every time a gust hits the rig, the helms-man will have time to ease the main sheet out and feather the main before the boat heels over. If the boat violently heels instantly the gust hits, and before the main sheet can be eased, then the mast is too stiff and the sail too full. If on the other hand, the gust passes by without showing any real signs of heeling the boat and the main sheet does not have to be eased, then the mast is too bendy. The mast must be made to bend progressively when required and not before.

To start with, the mast has to be a tight fit sideways in the mast gate at deck level. This must be checked from time to time as there is a considerable load here and the gate gradually wears. Tiny amounts of movement here give amazing amounts higher up. For instance, a quarter of an inch of play at the gate will produce over two inches of movement at the spreader tips, making a mockery of any deflections here. There should however, be a gap in front of the mast, which can be filled as necessary to stop it bending forward. If chocks are fitted, they work well but are limited in that they have to be set up before the race. It is obviously best to have several small chocks rather than one large one. Mark the deck where the front of the mast comes to, and then fit chocks in front, completely filling the gap. Hoist the sails in a medium breeze. With the genoa in its correct beating trim with all windtufts working together, sheet the main in. A small amount of backwinding is normal, but if the whole luff area is really backing, then remove a chock to allow the mast to bend more until backwinding is reduced to an acceptable level. This then becomes the starting position. From then on, experiment with taking chocks out as the winds gets up, taking out just enough to keep the crew sitting out. Remember that with the mast rammed hard against them, chocks are impossible to release, and tension must be released from the spar, either to get more in or to take some out. Unfortunately, they can get lost overboard unless threaded with thin cord.

So, in light winds (crew to leeward) there should be no chocks. Maximum chocks in medium air as long as the crew can handle the power by sitting out and keeping the boat flat. Remove chocks as soon as the main sheet has to be eased out.

Perhaps the single most important aspect of setting up the Wayfarer rig is that the mast should have about 1½" of pre-bend at the spreaders. This is created by rig tension and by a forwards thrust of the spreaders. Unfortunately, rig tension is loaded by tensioning the genoa halyard. This pulls the top of the mast forward - in fact the reverse of pre-bend. Fortunately, the



Wayfarer sailor can easily reverse this bend by standing in his boat and pushing forwards on the mast as high as he can reach. The mast will then 'ping' into a pre-bend position. For the middle of the mast to go forwards, the heel section below the pivot bolt must come aft. So it is very important that the heel does not come into contact with the step restraining pin until maximum pre-bend is on. Otherwise the mast will not be able to pre-bend sufficiently. The heel of the mast should however come up against the restraining pin with full pre-bend on. Otherwise there is a chance that the heel plug of the mast can be levered out of the mast step track. This is particularly important for Wayfarers with the genoa halyard led back along the centreboard box. Pre-bend is in fact easier to produce if the halyard is led aft, because then the bottom of the mast (below the pivot) is pulled aft as the halyard is tensioned. Therefore, for those Wayfarers using mast-mounted tensioning devices, it may be necessary to angle the spreaders slightly further aft to create an equal amount of bend.

The idea behind pre-bend in light winds is to flatten the sail to ease the leech and to give a shallow angle of attack. Using the vang and mainsheet to bend the mast would be unsatisfactory since this would tighten the leech and the tired, slow air then cannot open it out. Thus, even if the front (angle of attack) is flattened, the overall arc (curve) in the sail is not reduced. Once the breeze gets up, it is the forward thrust of the boom at the gooseneck which provides the best means of bending the mast. The vang and the main sheet both create this thrust although they have rather different effects on the mainsail. Main sheet tension primarily tightens the leech before bending the upper mast. This not only ruins the top batten/ boom relationship but also does little to open the slot, causing congestion and backwinding when the main is eased out in gusts. The disadvantage in this system is most obvious in gusty conditions where the mainsail needs to be constantly played in order to keep the boat upright. As soon as the sheet is eased, tension is reduced and the upper sail becomes fuller. This increases its heeling force at the very moment when there is more wind about - the very opposite of what is needed.

Even worse is the time lag if a centre main jammer is used which may well be under considerable load. The teeth of the jam cleat are often so well dug into the rope that it takes real brute force to tear it out. By this time, the water may already be pouring over the leeward side deck. With aft main sheeting the task becomes downright impossible. The job of forcing the boom forwards has to be the job of the vang. By its very angle (hopefully 45° to both mast and boom, it exerts a forward as well as a downward force. This means that it does much to flatten the lower sections of the main which helps to cut down backwinding in the area of the slot. Not only that, but the mainsheet has very little weight on it and can concentrate on its main job of positioning the boom at the proper angle to the centre line.

Vangs have therefore become very much more powerful in recent years. Winches and levers are being replaced recently by multi-purchase roller bearing blocks. It is very important that the controls be lead aft to the helmsman on both sides of the boat. This takes some thought as the Wayfarer was unfortunately designed before split controls, etc. were thought about. As the power of the vang increased, the need for a main sheet traveller declined. A decline that has been heightened by the trend towards mainsail twist. Remember that easing the leech of the mainsail, especially in light winds, means it can react to the air flow by opening and shutting according to the pressure of the horizontal air rather than the vertical tension of the vang and



the mainsheet.¹⁸ As this technique was being developed, it became apparent that it was necessary to copy the successful close sheeting genoa jib idea and bring the boom in towards the centre line. This then stopped the upper leech from opening out too much and feathering. In fact this move led to the decline of the main sheet traveller because using the traveller made it necessary to oversheet the mainsail to stop the boom from sagging off to leeward. This in turn overtightened the leech and stalled the mainsail. Thus, Wayfarer sailors have recently been encouraged to abandon the mainsheet traveller altogether and to cut down on the boom's sideways sag by raising the transom block towards the boom blocks. By fitting strops to each quarter, one forms a triangle that results in very little downwards load on the end of the boom. So it is easy to bring the boom in without tensioning the leech. Interestingly, this system can also be used if aft mainsheeting is used. This strop system is perhaps at its most vulnerable in very strong breezes when the conventional traveller slider can be eased slightly away from the centre to help feather the main. It may also give difficulties on close reaches where a slider can go right out to the quarter and help to keep the leech tight. If an aft mainsheet system is used, then a jam cleat should be fitted on the aft deck somewhere. The sheet can then be cleated when raising or lowering the spinnaker. If centre sheeting is used, then small loops should be fitted to the underside of the boom for the sheet to run through. Otherwise the helm will be garroted on the gybe. The centre main jammer itself should be easy to uncleat -especially on gusty days! The helm should not have to make undue effort to uncleat (i.e. raise his arms too high in the air).

Controlling mast bend

We now come, at last, to the best way of controlling mast bend - the proper organization of the relationship between mast, spreader and windward shroud. This means that by adjusting our support of the (inherently) bendy middle of the mast via the spreader, we can create bend or stiffness at will. This control of the spreaders is necessary for three very important reasons:

- 1 to control sideways bend above and below the hounds;
- 2 to restrict fore and aft bend;
- 3 to prevent the reverse bend that is created by jib halyard tension.

This latter is particularly disastrous for it causes ridges just behind the luff. Ridges, which in light weather (when there are no vang loads) keep the flow forward and close the slot, and which on the run, stop air from escaping forwards around the mast.

The key to correct spreader setting is, of course, the windward shroud. As this is holding the rig up, it is under considerable loading. Thus a great amount of control can be exerted over the mast by connecting it to the shroud by means of the spreader.

Control of fore and aft bend is the responsibility of the fore and aft position of the spreader tip (at the shrouds) and its relationship to the spreader root (at the mast). If the tip is well behind the root, the shroud is kinked aft. Under load, it naturally tries to straighten, thus pushing both the spreader and the mast forward, and creating mast bend.

On the other hand, if the spreader tip is positioned so that it causes the shroud to kink forward, both the spreader and the mast will be pulled aft as the shroud tries to straighten under load, thus inhibiting bend.

Sideways bend (created by the diagonal forward thrust of the boom) is controlled by the spreader length. The longer the spreader, the greater the angle that the shroud makes where it enters the mast at the hounds. The greater that angle, the stiffer the topmast.

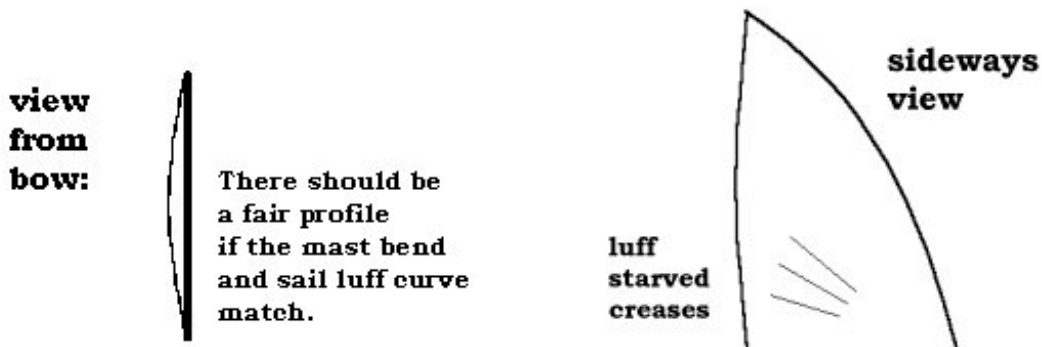
¹⁸ Al Schönborn's note: Mike points out that Ian Porter has not entirely abandoned the traveller which seems to help him in a breeze. I have a similar note from Ian to that effect. He states that he uses a bridle in light airs and the traveller in a breeze.



Also, the longer the spreader, the more the shroud is pushed sideways out of the straight line. As the shroud comes under tension and tries to straighten, it pushes against the spreader and hence against the mast. There is a danger that if the spreader is too long, the mast can actually be pushed past the straight line and bend to leeward. This not only closes the slot by pushing the main towards the jib, but also makes it impossible for the air to conform to the mainsail's leading curves. Obviously this is more likely to happen in light airs when the vang is not so loaded and when the boom is amidships. A good point from which to start in Wayfarers is to have each spreader 50,8 cm (1'8") long and to fix the spreaders so that the tip to tip distance¹⁹ across the back of the mast is 96,5 cm (3'2").

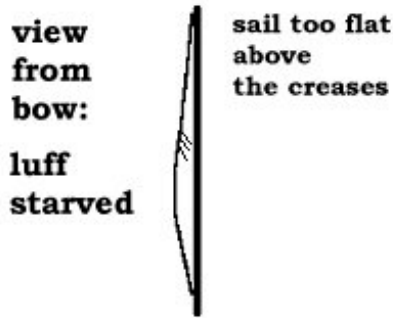
To find out whether the spreaders are doing their job correctly, there are three simple guides:

- 1 The most important of these is the comparison test with the rest of the fleet. If your boat is going very fast off the wind and yet slowly to windward, the mast is probably too stiff, while if the boat is slow off the wind and the crew sit out later than other boats when beating, the mast is probably too bendy. If it is too stiff, the spreaders have to be shortened and the tips angled further aft. If it is too soft, the spreaders need to be lengthened and the tips angled further forward.
- 2 The second guide concerns the way the sail fits the mast. Any sail will crease when the mast bends so much that the leech is pulled into the belly of the sail. As the mast bends there is also a shortening of the distance between the black bands on the mast. If the luff curve fits the mast bend, the creases will disappear when the cunningham is tensioned. Failing this, the luff curve and mast bend obviously do not match. The point where any persistent creases, if extended, would reach the mast, is the area of incompatibility. By standing in front of the boat, one can easily see why the creases are there. The leeward curve in the fullness is not fair, and there will be a distinct change in the profile. This marks the changeover point between the area where the luff curve is being used up by the mast bend and the area where the luff curve is not being used up. The sail is either too flat above, or too full below the line.

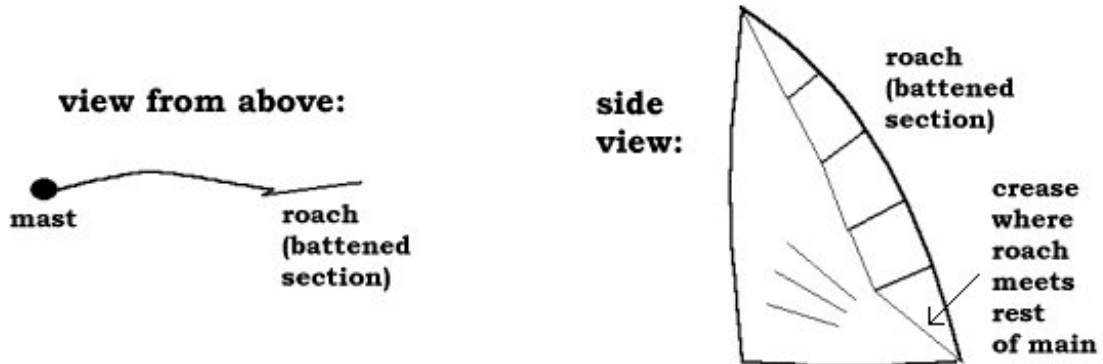


The solution is to progressively stiffen the mast by lengthening the spreaders and angling them further forward until the creases disappear with light to moderate cunningham tension.

¹⁹ Al Schönborn's note: we measure this from shroud to shroud



- 3 The final guide is that sometimes the luff curve of the sail and the bend of the mast match so well that all the available fullness is used up. Then the sail becomes so flat that it cannot support the roach (= leech) which pivots to leeward about the straight line from head to clew. As the aft edge of the sail bends away, the inner end of the battens often sticks up in an unsightly S bend.



Power will be lost, pointing will be poor and there will be no off the wind speed. The solution is to straighten the mast more by lengthening the spreaders and angling them further forward. Experimenting with the mast is best done outside the race situation. In the race itself, too many things are happening, making it impossible to concentrate on the work that the spreaders are doing. Try differing rigging tensions, because the slacker the rigging, the less work the spreaders will do. If possible, try to see your boat from outside to calculate from a distance, the effect of these changes.

Wind tufts should be fitted to leech of the main. The idea is that they should stream aft on a properly set and trimmed main sail. If they bend round to the leeward side of the sail, the air flow on that side has broken down because the leech is too tight. So ease the vang and/or the mainsheet. If they bend round to windward, the leech is too slack and the vang and/or mainsheet need to be tightened. Beware however, of watching the windtufts too slavishly. In fluky conditions, they can be too twitchy.

One very important guide to leech tension is that the whole mainsail luff should backwind at the same time. If the upper luff backwinds first, the leech is too slack.

Finally, the job of the cunningham is to provide extra tension to the luff when the mast has been bent and the distance between the black bands thus reduced. It must not be over-tensioned. Otherwise a vertical ridge is created behind the luff and the leech is opened out. The correct way to use the cunningham is to bend the mast with the vang and/or main sheet to get the top batten and boom in proper alignment, and then to tension the cunningham sufficiently to remove any luff creases. If in doubt, leave well enough alone and accept the creases.



The golden rule is: vang on and, if you have time, cunningham on, but if the vang is eased, the cunningham must be eased, whatever else happens!

Summary of key mainsail related measurements:

Mast Rake: 715 à 717,5 cm (23'5½"-23'6½"), measured from mast head black band to underside of mainsheet track in centre of tiller port with the rig under 150 kg (330 lb.) of tension and the mast pre-bent;
Spreader Length: 50,8 cm (1'8"), measured from mast;
Spreader Deflection: 96,5 cm (3'2"), measured in straight line between tips.

General main sail notes

- Locate a tell-tale approx. 3/4 up the leech of the sail on the trailing edge (near the back of the **W** for the sail #).
- Sew the battens in place to prevent loss.
- Roll the main and jib together on large plastic or cardboard tubes to keep them smooth when not in use. These are available from carpet stores.
- Sew the end of a light shock cord to the leach of the main approx. 30 cm (12") from the clew. Fasten the other end to the end of the boom. This cord helps to prevent spinnaker sheets from getting wrapped around the end of the boom when gybing.

4mm pre-stretch line is best for the various control lines. Use a different colour for each service to avoid confusion.

1.4 Genua control, shape and trim

1.4.1 The genua halyard

Use 3mm 7 x 19 stainless steel wire to handle the high tension on the halyard. It will be an equal partner with the sidestays (which you will note are also 3 mm wire!). Have an adjustable fitting between the top of the jib and the halyard to accommodate different sail sizes. Small galvanized chain links work well and the appropriate number of links can be left on each sail.

Installation:

I am assuming here, that you are replacing an old jib halyard, and that you already have a tensioning device installed.

Swage a loop lined with a thimble into one end of your new halyard wire. The length of this wire will need to be around 610 cm (20'), depending on the luff wire length of your jib and how you will get to your tensioning device. On "Shades", our halyard comes straight down to the magic box which is about a foot below the gooseneck. If you lead your halyard out the bottom of the mast at centreboard level and then come up or aft to your tensioning device, you will, of course, need more wire.

Take the mast down, and thread the un-swaged end of the wire through the jib halyard entry block. On the old-style Proctor masts, this wire then needs to be encouraged to slide down the mainsail groove towards the gooseneck. On Abbott masts or the newer Proctors, where the halyards are internal and exit at the foot of the mast, the blocks at the foot will have to be moved to thread the wire through. Get your jib out but do not attach its tack to the stemhead fitting. With the mast still down, shackle the thimbled loop of the halyard to the head of the jib, making sure that the other end of the halyard is prevented from going back into the mast (get a friend to hold it or tape it securely to the mast). With the loose halyard end still secured



(!), put the mast back into its upright position. Now attach the tack to its proper spot. Take the loose halyard end and pull the halyard as tight as you can reasonably get it by hand. Mark the spot where the wire goes around the hook of your tensioning device. (I do this by slightly kinking the wire in that spot.)

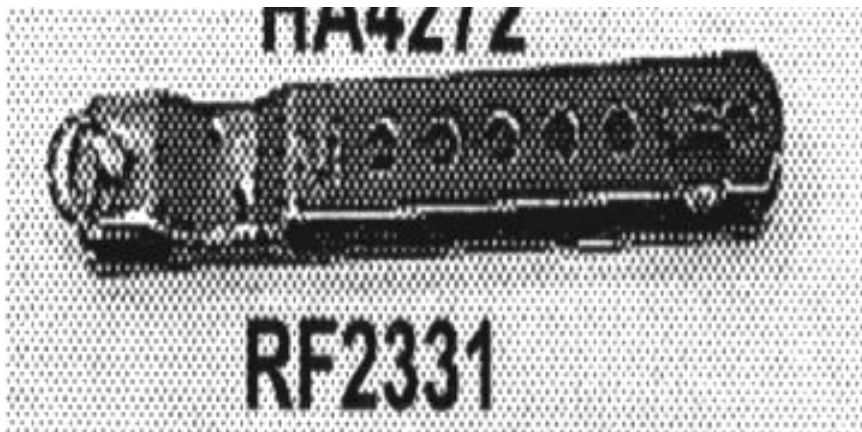
Undo the tack of the jib so that you can pull more halyard out of the mast. This makes the cutting and swaging a lot easier. Cut off enough excess wire to leave about 15 cm (6") of wire after the 'kink' or other such mark. Now swage a 15 cm (6") loop into the 'loose' end of the halyard. If you use #4 Dacron braid line (cheap!) as a halyard tail, you can simply tie this onto the 6" loop with a bowline. #4 line runs nicely, even up the mainsail groove, and if its thinness makes you nervous, soak the part where rope meets wire with 5-minute epoxy glue to keep the #4 line from fraying too easily. You'll need less than 610 cm (20') of this line. My apologies for not knowing more precise dimensions!

Now you can haul the jib down and stow your jib halyard as usual. the bottom of the loop should be about a foot below the bottom black band (i.e. gooseneck in normal position). Mark the position of the bottom of the loop on the mast.

If you already have the right halyard but wish to add a tensioning device

Your Highfield Lever (or Magic Box) must be attached such that its hook in its uppermost extended position (see diagram on right) matches the position of the halyard's bottom loop when the jib is hoisted. There are numerous possibilities for attachment. To attach the tensioning device directly to the extension of a sail groove, the best set-up I've seen is the use of bolts with square nuts that have the corners turned inwards. This lets them really grip the inside of the groove and prevents the lever or magic box from sliding along the groove under the considerable pressure that will be exerted. If you are going through the main body of the mast, beware of screws' points getting caught on line that run up and down the innards of the mast. You need to file the self-tapping screws accordingly or do as I do and use Monel rivets.

Length Adjustment: As many of us have already found out the hard way, a wire halyard that is the absolutely perfect length for our current jib may suddenly be an inch or two too short or too long for the next jib. To avoid the need for new halyards or a new placement for the magic box or lever, we have added a shroud plate (see illustration below) to the sail end of the halyard. The shackle goes into the single hole at the left end while the swaged eye of the halyard slides in from the right end as many holes as is necessary. With our current jib, that is 6 holes in, which allowed the chain plate's sides to gape a bit and left me with the fear that the spi halyard might get caught in there.





To avoid such a possibility, and to make sure we don't lose the horseshoe-shaped part of the shackle when the pin is out, we have taped up the entire sides (but not, of course, the ends!) of the shroud plate (which I believe is Ronstan #RF2331, or so it says in my local catalogue...)

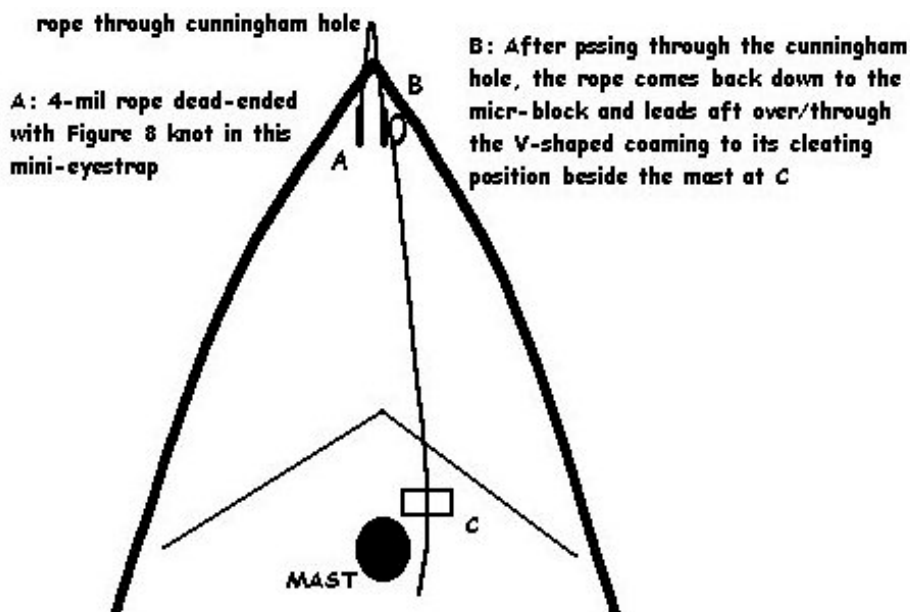
Connect the wire halyard to the Highfield lever or the magic box to adjust the jib luff tension. To set the jib halyard tension, sail to windward and check if the leeward shroud is slack. Tighten till it is just tight or, if necessary, loosen until it is just straight. Another guide to jib halyard tension is the sag in the jib luff when sailing to windward. There should always be some sag (approx. 5 à 7,5 cm (2-3") at the middle of the luff) as compared to the vertical line of the forestay.

It is useful to mark the approx. settings for light, medium and heavy air so that rough adjustments can be made quickly when necessary. Coil the rope halyard and fasten with a Velcro loop out of the way (on the side of the mast step). Set the jib tack low enough so that the foot of the genoa will lie along the deck preventing air from flowing underneath. This escaping air will make the foot vibrate and reduce the power of the sail.

In light wind use the jib halyard to apply rig tension and some pre-bend to the mast. Take up this tension on the forestay control line. Then loosen the jib halyard tension until there is approx. 3" of luff sag. If the genoa tack is not fastened to the bottom of the wire luff, it will be necessary to install a genoa cunningham. This must be used sparingly trying to leave small horizontal "speed wrinkles" along the luff of the sail.

1.4.2. The genua cunningham

Our jib has the luff wire inside a sleeve of sailcloth. The head is attached to the wire, but the tack is loose and needs a jib cunningham. Our jib cunningham is dead-ended through a small eye-strap just to port of the centre-line of the deck as far forward as we can get it. From there, the 4 mm pre-stretch rope (dead-ended with a Figure Eight knot) goes up through the cunningham hole in the tack and comes down to a parallel eye-strap with microblock on the starboard side. Finally, the rope runs aft through our coaming to a silver clam-cleat with a lead (CL211) or a good cam cleat near the mast. (see figure below)



Upwind, we tighten the cunningham enough to stretch our (shrunken, 5-years old) luff tape a bit but stop short of stretching the actual sailcloth in the luff unless the wind really comes up and we need to move the draft forward.

Note: If your jib is fastened to the luff wire at both ends, you need to make sure that your luff is not automatically given a cunningham effect as you tighten the halyard (and thus, the jib luff wire) - i.e. if your sail cloth has shrunk, then the cloth will stretch it as the wire comes under tension and you will have a vertical cloth wrinkle just aft of your luff wire! This is horribly slow - especially in light airs!

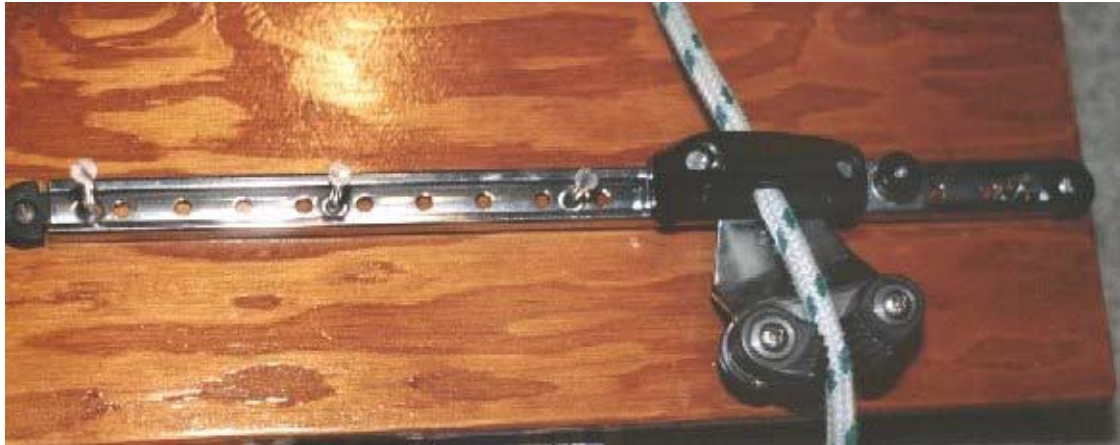
1.4.3. Genua controls and adjustment²⁰

It is useful to define light, medium, and heavy air sailing conditions. It can be different for each skipper/crew/boat combination. It is set by conditions sailing to windward:

- light: The crew must sit inside the boat or to leeward to keep the boat flat.
- medium: The crew and skipper can keep the boat flat while normally sitting or hiked on the side deck.
- heavy: The crew and skipper cannot keep the boat flat without luffing, easing the sheets or flattening the sail shape.

The genua sheet

Genua sheets are normally about 6 metres (20 feet) of quarter-inch braided rope as a jib sheet. (see photo below) Warning: 20 feet of rope is plenty for most purposes but will not allow you to use a whisker pole to wing the jib - unless you untie the other end!



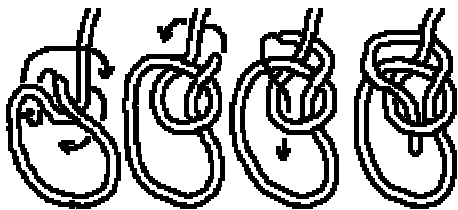
Please note that this line is quite slippery when you first buy it. It took us several regattas' worth of racing to get rid of the shine on the rope and replace it with the nice, soft fuzz you see above.

²⁰ from: Derwyn Hughes: sail shape summary



We mostly use the sheet as a continuous sheet (see demonstration in the photo above).

To do this, you merely run one end of the sheet out through each fairlead from inboard to outboard, and then tie each end (with a bowline) through the jib clew grommet. Other methods of attaching a continuous sheet to the clew exist, but we have found the bowline method works best.



Thread the loose end through one fairlead (outside to inside), lead the sheet across the centreboard and out the other fairlead, back around the front of the mast to the jib clew grommet where we tie it through the grommet with another bowline.

If you prefer not to use the continuous sheet method, take the 20 feet of sheet and "fold" it in half. Shove about 15 cm (6 inches) of the loop thus produced through the jib clew grommet, insert the loose ends through that loop and pull the loose ends (together!) until you have a good, tight knot at the clew. Other knots can be used, but this is the fastest way and, in my experience, will hold even under great tension from one sheet or the other. If you use a lot of different sheets or jibs, and don't like the continuous sheet method, you can use the method we used until about 10 years ago: Fold the sheet in half and make a two-inch (5 cm.) loop by means of a good, strong seizing with waxed whipping thread. This way, you can attach the sheet to the clew grommet by means of a shackle.

It takes the crew a bit of time to get used to the continuous sheet method - I was learning it when Wayfarer Man took over the helm a couple of times this year (2000). During a tack or gybe, the crew has to stay inside the triangle (2 fairleads and the jib clew) formed by the sheet, or things get a bit messy. But the beauty of this system is that you (virtually) never totally lose the sheet or grab the wrong one.



Using a sheet that is no more than 8 mil. in diameter not only makes your sheet cheaper to buy, it also stays in the cleat better. In the photo above, there are several useful things to note:

- the fairlead itself is made of plastic and will eventually wear through (usually while you're doing very well in a race!) I believe it is possible to buy spares of just the fairlead part of the assembly but I'm not certain since I have some spares that will last me for a long time. If you use a plastic fairlead, it would be wise to contact its manufacturer/distributor and order in at least a couple of spares!!
- your jib sheet cleats should have metal cams not much is more annoying to the crew than a jib fairlead assembly on which the cleat plate bends down when you try to cleat the sheet. One way or another, you need to ensure that this plate is supported from underneath. It must not hang above thin air (i.e. this usually means putting your jib track on or near the outside edge of one of your front seat boards. If your cleat/fairlead combo do not come with built in supports such as the two shown above, you should attach a piece of wood of appropriate dimensions under the cleat and plate. This would mean getting longer screws than the ones currently affixing the cleat to its plate





The photo above shows the actual jib track arrangement we use on Shades. Once every year or two, we use the outer track as well as the inner one - in survival conditions with major waves. I had the spare track and cleatless leads, so I installed them, but do not recommend that people go to the trouble and expense of installing such a second track on each side. The best thing to be said for this extra track is that if the regular fairlead breaks, the outer one makes a decent emergency replacement.

Note how our main track is about 30 cm. (12") long and runs as close to the outer edge of the inner seat board as possible so that the support under the cleat rests on the inner edge of that board. The aft edge of the track is bolted through both seat board and thwart, while the rest of the track is also bolted but only through the seat board. This is not the case with many "factory" equipped boats and I recommend bolting as a good safety play.

Although the above photo doesn't look like it, our cleat support rests nicely on the seat board. A lot of Wayfarers come with the track on the inside edge of the outer board. This leaves the cleat support hanging over the space between the two boards. If you like your track in that position, you should fill that gap between the boards with an appropriately shaped length of wood or metal, and then make sure your cleat plate has a support that keeps it angled slightly upwards.

The basic fore/aft position of the fairlead is set by running a string from the center of the jib luff, through the clew and extending in a straight line to the fairlead track. This is a good guide to the correct position.

Install tell-tales along the luff of the genoa. Top one at 3/4 of the way up the luff, center one in the middle, and lower one about 25% from the foot. These are best made by using brightly coloured wool. Pull a strand through the sail cloth with a needle, then put knots on each side of the cloth to hold it in place. Locate the tell-tales approx. 12,5 cm (5") back from the luff wire and cut them to be 10 cm (4"). This prevents them from getting stuck around the front of the luff. Periodically treat them with anti-static spray. When sailing to windward, set the mainsail sheeting. Then sheet in the jib until it slightly backwinds the main. Then just ease till the backwind stops. When close to the correct jib sheet position very small adjustments make a big difference to performance. A one inch change in sheet position will open or close the slot between the jib leach and the main by approx. 6 inches. It also changes the relative tension in the upper and lower sections of the jib. To fine tune the jib sheet adjustment, luff the boat slightly and check if the three windward tell-tales react evenly:

- if the upper one breaks first, sheet in slightly;
- if the lower one breaks first, ease the sheet slightly.

The goal is to have all three tell-tales break evenly. Once set, the skipper should steer the boat by watching the middle tell-tale. In the optimum position, it should be streaming backwards and slightly upward at an angle of about 45°. It is useful to sew in brightly coloured threads into the jib sheets about every 5 cm (2") along about a 30 cm (12") section which is normally passing through the fairlead when going to windward. In this way you can learn which settings work well for different wind conditions, then use them as a guide each time you tack. Do not oversheet the jib as this reduces the power of the sail and will slow windward speed. "When in doubt, let it out" is especially true as the wind drops to light air. Ease the sails, bear off slightly and keep the boat moving. In gusty wind conditions, ease the sheet slightly as the wind drops, then sheet in again as the next gust hits. Install a tell-tale about 2/3 up the leech of the jib. This can be used as a guide to jib sheet tension. Trim the sheet until the tell-tale no longer flows straight out then ease it slightly. To use this continuously a window would be required in the luff of the main.



When going to windward in heavy air, the jib can be kept sheeted to a typical position for medium air (perhaps slightly eased). Then the boat is kept flat by luffing the sails as much as necessary. Ignore the tell-tales and just pinch up enough to keep the boat flat. This combined with hiking, flattening the main sail, easing the traveler, and perhaps slightly raising the centreboard provides good speed to windward. The real key is to keep the boat flat.

1.4.4 Genua sail setting

For the genoa, there are two basic aims:

- 1 to have a sail with an appropriately rounded entry for the conditions, which leads into a fair (even) curve ending with an unhooked leech. The tighter your jib halyard, the flatter your entry will be. There is a trade-off here: as the entry gets rounder, your steering groove becomes wider but you will point lower. Therefore it makes sense to sail with the flattest possible entry that will still let you stay in your steering groove with relative ease. The test here is that you tighten your jib halyard until both the windward and leeward tickers begin to indicate turbulence almost simultaneously as you sail close-hauled. At that point your groove is too narrow and you must loosen the jib halyard slightly. Overtightening the halyard has the same effect on the genoa as overbending the mast has on the main - the entry gets too flat! If in doubt, let it (the halyard) out!
- 2 to have a sail which sets at a more or less even angle to the wind up and down the entire sail. In difficult steering conditions, you will need to let the upper part twist off somewhat to leeward as twist also widens your steering groove.

Lead Position:

in/out:

This position is not crucial. Pretty well anywhere on the forward seat is fine. Our track has lived in the same basic spot for about 20 years: along the outside edge of the inside board of the front seat (which puts it about 52 cm (20½") from the centreboard box at its aft end)

We have installed a second parallel track along the outside board but use this rarely and to no great discernible effect - in survival conditions + waves.

fore/aft

A good starting position for your lead is where the extension of a straight line from the mid-point of your jib luff through the middle of the clew cringle would meet your track. On "Shades", this position is about 9 cm (3½") forward of the front edge of the centre thwart.

Your jib can, in fact, be made to have an appropriate vertical set (twist or lack thereof) from numerous lead positions. Since increased tension on your sheet while sailing close-hauled brings in the upper leech about five times as much as the lower leech, it is merely a matter of finding the right sheet tension for your lead position and wind strength. The easiest test for the right sheet tension is to check your upper luff tickers against your lowers as Mike Mac Namara suggests: If the uppers show luffing before the lowers, you can/should sheet in more, and vice versa. If the tickers all start to show luff at the same time, then your sheet tension is perfect. The further aft you set your lead, the tighter you will need to sheet in to get the right balance. This in turn results in a flatter foot which is the same effect as tightening the main outhaul.

Tickers: We have three sets of 10 cm (4") virgin wool luff tickers at quarter, half, and three quarter height - just over 10 cm (4") aft of the luff wire and away from as many seams as possible to reduce snagging. Again, we use a sailmaker's needle to thread each ticker through the cloth. We keep them centred with an overhand knot (half a reef knot!) close to each side of the cloth. We also have a leech ticker at about 3/4 height (but away from the spreaders!) that gives

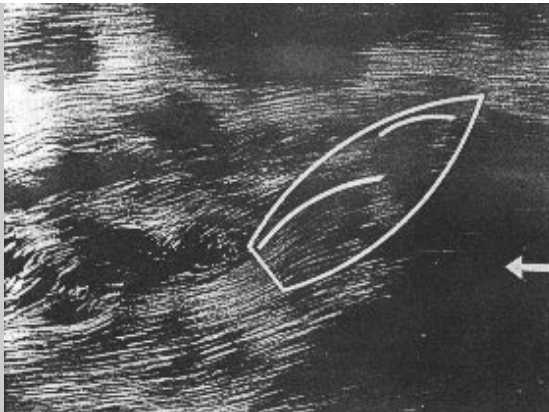


an even more sensitive sheet tension reading than comparing the upper and lower luff tickers. As with the main leech ticker, we sheet in until the leech ticker starts to get sucked behind the sail.

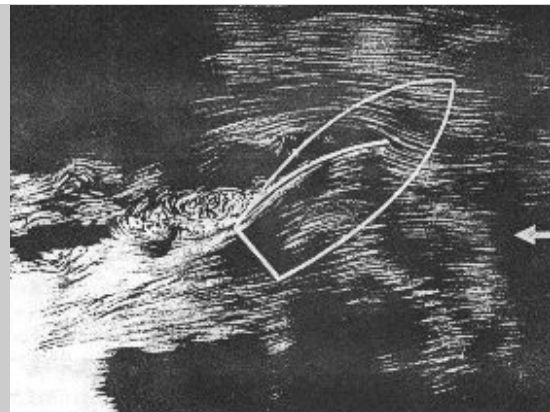
Note: With the main, we often oversheet past the optimal position indicated by a leech ticker that is beginning to show stall, once we're up to speed. But this should never be done with

1.4.5 The genoa shape and trim

The importance of getting the genoa sheeting right is very well documented and the sailor has only to look at the superb flow diagrams in Eric Twiname's "Start to Win" to see how the sail works. The Wayfarer genoa is a large sail which overlaps the main by some distance. Its contribution to boat speed is therefore considerable.²¹



A simulation of wind flow round a beating rig using a water model. Flow is severely bent by the rig, particularly directly downwind and to windward of the boat.



The mainsail shape alone set at the same angle to the flow. Without the jib, the aft part of the sail is stalled, so turbulence increases and the driving force is reduced.

Its front is responsible for aligning the air flow over the rest of the sail plan. Thus, getting the angle of attack right is vital, while at the back, the leech has to deflect and then squeeze the air through the slot. If the leech is too tight, the air gets stalled, and if it is too slack, the air is not squeezed enough. Both these aspects of the genoa, angle of attack and leech tension are controlled by:

- the fairlead position;
- the amount the crew pulls on the sheet.

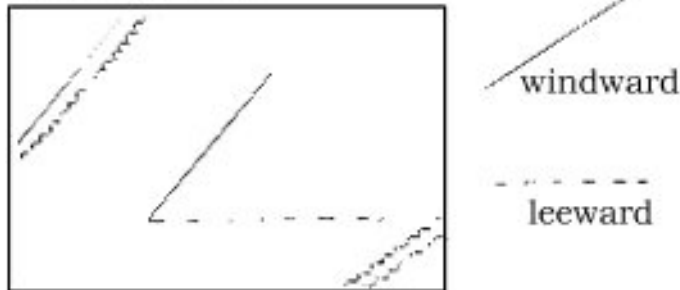
In order for the genoa to work properly then, it is particularly important that the air can flow over both its windward and leeward surfaces. If the angle of attack is too wide, the helmsman has to bear away and sail further than other boats. If on the other hand, it is too shallow, the sail is difficult to read and is prone to stalling.

Luckily, setting up the sail is very straightforward. It is simply a matter of organizing the best positions for the fairleads, both fore and aft, and athwartships; of controlling the rig tension, and perhaps most important of all, of calibrating the sheet tension. The best way to do this is to enlist the help of wind-tufts. Approximately 10 cm (4") long, these should be positioned 15 cm

²¹ As I re-read this article, I (still) find it a bit complicated for me to follow completely. If you are in the same boat, you might enjoy my attempt at simplifying this entire routine under the heading Al Schönborn Sail shape for dummies.

(6") or so from the luff and away from seams as they become snagged in stitching. If they are placed at quarter, half and three quarters height along the luff, they will give some idea of the air flow over the sail. As diagram 1 shows, the windward tufts stream slightly upwards when indicating correct sail trim, whilst those on the leeward side stream horizontally.

diagram 1:



They should all work together, with the top windward windtuft angled up slightly more than the other two. This will mean that the sail is sheeted correctly with just enough leech tension to control the whole sail.

This leech tension comes from both the angle of the sheet, from the clew to the fairlead, and from the tension on the sheet itself. As a general rule, the middle leech will move about 12,5 cm (5") for every inch the sheet is moved through the fairlead. Considering this 5:1 ratio, it is therefore very important not to over-tension the sheet. If in doubt, ease the sail until the top windtuft collapses and then sheet in a bit to bring into line. It is a good idea to mark the sheet somewhere near the fairlead to help quantify things.

The centre of the fairlead track should be approximately 53 cm. from the centreline and some 235 cm. from the transom. Although some success has been found on boats fitted with sideways adjustment, it really is an unnecessary expense. There is also no need to lead the genoa sheet aft to a jammer on the thwart. This is not only an unnecessary expense but adds complication. All that is required is a simple track with fairlead and integral cleat.

The modern close-sheeting genoas have to be cut fuller because the closer in one sheets, the more the leech has to be eased to keep it away from the mainsail. It is this 'easing' with its reduction in leech tension which makes the closer sheeting angle work so well. As diagram 2 shows, the closer sheeting angle and eased jib sheet allow the jib leech to follow the contour of the mainsail. This gives a constant slot width between the back of the jib and the front of the main.



diagram 2:



1. wide sheeting with tight jib leech



2. close sheeting with slack jib leech

A wide sheeting angle with its tighter leech results in a slot that is narrow at the top and wide at the base. Unfortunately, then the slot can only be right at one place along the entire length. Many people believe that by moving the leads inwards, they will point higher, simply because they are bringing the jib further in. In fact, they may well point higher, but not for this reason. What happens is that the air can get through the eased slot more easily, reducing congestion and backwind. The jib can also be sheeted as a complete unit throughout its height without the need for excessive leech tension.

The fairleads should be positioned, and the sheet tensioned, so that all three windward windtufts collapse at the same time, and so that the back of the jib parallels the leeward bulge of the mainsail (i.e. to give a parallel slot). If the slot is right but the top tuft lifts first, try moving the lead aft slightly to enable you to keep a parallel slot while sheeting in tighter. If the bottom tuft lifts first, reverse the procedure. To do this check on land, choose a day with 8 to 10 knot winds. Position the boat in clear, non-turbulent wind, put appropriate tension, about 150 kg (330 lbs.), on the jib halliard, and put the boat on a close-hauled course. Once all the windward tufts lift in unison like well regimented soldiers, you may wish to check the angle of attack by standing directly in the eye of the wind about 6 meter (20') from the boat. If the windtufts are doing their job properly, you should be able to see neither the windward nor the leeward side of the jib throughout the luff length. If you can see one or the other side, then you will have to start again. For instance, if the leeward side at the bottom is exposed, the sheet has to be moved further aft to flatten the bottom of the sail. The further forward one has to stand in order to get this 'in line' effect, the better the boat will point, and vice versa. At this stage, it is possible to see if a closer sheeting angle will make you point better, simply by pulling the sheet in towards the centreline between the lead and the clew while re-organizing the fore and aft tension to get the tufts working properly once more. If you now have to stand further forward to get that luff coming straight towards you, then you will point better. A final check of the slot is now in order. If everything is as it ought to be, you should still see a parallel slot between the back of the jib and the leeward bulge of the mainsail, when you stand aft of the boat²².

²² Al Schönborn's note: On "Shades", we simply put the lead in a position where, with the genoa sheeted in, a straight line from mid-genoa luff through mid-clew cringle would meet the front seat. What with 5" of upper leech coming in for every 1" of sheet, it is simply a matter of sheeting in until the top and bottom tickers flow the same way, i.e. when I sail to keep the lower tickers in the position shown in diagram 1, my crew adjusts the sheet so that the upper tickers match that position [or we get the same effect by using the upper leech ticker on the genoa]. By



In a breeze, one particular problem facing Wayfarer sailors is genoa luff sag. Excessive jib luff sag not only makes the front of the jib fuller to ruin pointing, but also hooks the leech to congest the slot at the very moment when the main is also being eased out to keep the boat on its feet. Obviously, this reduces the efficiency of the sails. To counteract the problem, increased rig tension is needed via a tighter jib halliard. This is achieved either by adjustment of a Highfield lever on the back of the mast or, better still, a "magic box" or multi-purchase blocks on the centreboard case. The halliard should be tensioned to suit various conditions - just enough tension to keep the leeward shroud from being slack while sailing closehaunched. With the correct amount of jib luff sag, the jib is opened to make the slot wide enough and to reduce the amount of curve that the air has to make, flowing over the jib.

Once you have marked the fairlead track for the medium weather position, move the fairlead aft until the windtuft at three quarters height collapses and then move the lead one inch or so forward. This heavy weather position should also be marked. Never go behind this mark because the collapsed windtuft shows that the sail is feathered and that the air flows equally past it on both sides. It has no drive and simply acts as a flag. Without this drive, the boat cannot point so well and falls away from the wind slightly. This is well worth remembering when considering pointing ability, for it does not necessarily follow that poor pointing comes only from having the sail too full at the front. It can also come from having the top of the jib (or main, for that matter) feathered. Usually, jib luff sag means that this offending part is hidden away from the helmsman's sight behind the mainsail. If the top windtuft has feathered, pointing the boat according to the bottom windtuft will slow the boat down. Nearby boats will be pointing about the same but will be going faster, so the helmsman bears away to go the same speed, but then he finds he is having to sail further.

This can perhaps be described as a 'psychological non-pointing'. The solution is easy, involving nothing more than moving the fairlead forward to bring the top of the jib into action. If this doesn't improve pointing, then the front of the jib may well be too full because of jib luff sag. To avoid these problems, a few moments have to be spent before every race and up the beat to check that:

- all the windtufts are working together
- the leeward shroud is not too slack.

In light airs, there is less pressure on the jib luff and very little luff sag. Thus the sail will be flatter than would be ideal, especially if normal sheeting is used. The sail has to be eased on the sheets to give it some 'life'. Unfortunately this will open the leech too much if the normal middle breeze sheeting position is used. In order to be able to ease the sail to put in that extra fullness, the fairlead must be moved forward almost to the point where the bottom windtuft collapses. When easing the sheet to give increased fullness, you should slacken the jib halliard a little as well. This gives extra luff sag which helps to increase the fullness. Once the light weather lead position has been established, it too should be marked.

It will be seen therefore, that boats point best in the middle winds when the sail is at its most efficient. They point progressively worse as the wind gets up or dies away. Although the careful marking of the light, medium and heavy weather fairlead positions can help, the sailors

moving the lead forward, we get the required leech tension sooner and end up with a fuller foot [parallel to eased outhaul on main], and by moving the lead aft, we get to the required leech tension later and end up with a flatter foot. For what it's worth, we have not moved our genoa leads from their standard position for years!



themselves can improve things considerably. It is the job of the helmsman to constantly watch the bottom windtuft to keep the boat pointing properly and it is the job of the crew to watch the top windtuft, using the motto "if it collapses sheet in, and if it hasn't collapsed, ease it out." He must therefore be prepared to keep the sail constantly on the move. This enables the helm to get the lower windtuft working and keep the boat in the groove, knowing that the leech is on the move to keep the angle of attack, and the leech opening and closing appropriately in relation to how much wind is going over the sail.

If anything, it is better to have the sail undersheeted, so that one has a nice easy backwinding to spot, rather than to have it too tight and stalled, which is much harder to see. This is important not only in light winds when there is no movement of the jib sideways which makes it very easy to have a choked slot (see diagram 2), but also makes heavy air sailing easier as the boat will not be flattened by the gust before the helm has a chance to feather the main. Even if the spinnaker is used off the wind, some attempt to sheet the genoa should be made to create a slot between the spinnaker and genoa, and the genoa and main. The helm has to do this because the crew will have his hands full. So try to get the windtufts flowing even on a reach or broad reach. On a run, the genoa will of course be blanketed, so ease it as far from the main as possible without letting it flap.

Finally, by keeping a close eye on other boats, particularly those at the top of the fleet, and by religious reading of Class magazines, it is possible to keep pace with the sheeting developments. It is not a bad idea either, to find out what happens in other classes, but nothing works so well as that constant patrolling round the boat in the dinghy park to see exactly what things look like from all angles.

Wayfarer genoa setting up guide:

1. Centre of fairlead track measured to inside of transom:		235 cm
2. Centre of track to centreline (N.B. Track to be parallel to seat edge)		53 cm
3. Track to be bolted to seats. Length: Suggested fairlead type is HA 4274 or RWO 2500 (fairleads), 2700 (track), 2770 (end stops) (complicated H tracks or tracks with leads led back to thwart are not necessary.)		30 cm
4. Bearing surface of fairlead measured to transom:	in light winds:	240 cm
	in medium winds:	238 cm
	in heavy winds:	235 cm
5. Tension on windward shroud:	in light winds:	135-150 kg
	in medium winds:	150-158 kg
	in heavy winds:	158-163 kg
6. Mark sheet near fairlead.		
7. If in doubt, ease!		



1.5. Spinnaker setup and controls

1.5.1 Spinnaker system in boat

1. Spinnaker halyard

Tie the halyard very carefully to the sail. If it comes undone, the halyard may have to be re-threaded through the mast.

Run the halyard back under the thwart where it can be easily used by the helm. The halyard should be 4 mm line & 13,7 meter (45') long.

Generally hoist the sail right up to the halyard block on the mast. Some people ease it about 15 cm (6") on close reaches in medium air but this is of questionable value.

Use the guy hook on the side deck to keep the halyard tight when the spinnaker is not in use.

2 Spinnaker sheet

Some racers use one continuous spinnaker sheet. This should be 17,5 to 20 meter (58'/68') of 5 or 6mm soft braid line. The sheet passes through a block in the side deck located as far aft as possible. It is then lead forward through blocks so that it is easily controlled by the crew in the hiked position.

It is handy to have a cleat to keep the sheets tight when not in use. The cleats can also be used to pre-set the sheet in the appropriate position for a reach just before hoisting. Sew coloured thread into the sheet at the spot where it would be cleated for a reach. A similar arrangement for the guy will also work. The objective is for the spinnaker to fly immediately as it is hoisted. It may be risky to "pre-set" the sheet in strong winds. If the sail fills before crew and helm are hiked, the boat may capsize immediately!

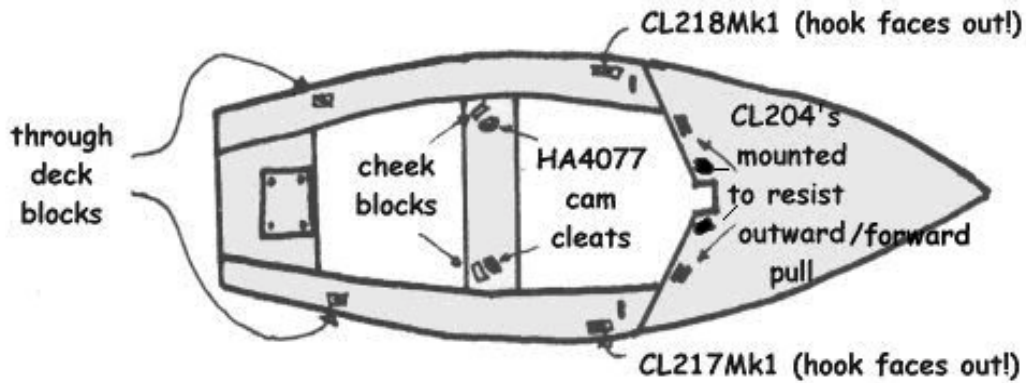
Install open hooks combined with a cleat on the side deck just behind the shrouds to control the guy. The crew must adjust the guy to keep the pole approx. 90° to the apparent wind. As the guy is eased, the sheet must be trimmed to keep the sail in the right position to the wind. The masthead fly is a useful guide to the wind angle.

Controlling the spinnaker sheet is the same as any other sheet. Ease until the luff of the sail begins to collapse, then trim slightly. This sheet adjustment is done continuously to maximize power from the sail.

Install a mini-bowsprit made of plastic coated copper electrical wire. Have this loop stick out 7,5 à 10 cm (3 or 4") in front of the bow to help keep the sheets from falling underneath the boat (a very messy event).

3. Spinnaker sheeting plus halyard cleats for packed spinnaker

I recommend one long spinnaker sheet 17,7 meter (58') of 5 mm soft-braid. Continuous sheeting is neater and assures that you never lose a sheet for any reason. The lighter, thinner sheets are a must since they keep the chute flying in lighter airs and cleat much more securely in the clam cleats at the shrouds than does the more commonly used 6mm (¼") line. (This is important!) Our sheets and halyard are attached to the spinnaker with small bowlines (which are very easy to do with a bit of practice). This saves weight on the sheets as well as potential mast top foul-ups that result from using snaphooks on the halyard. The two black clam cleats mounted to resist outward tension on the aft part of the foredeck (*see diagram*) and the two silver clam cleats at the shrouds (CL 217&218 Mk. 1) are a big help in two ways.



Once the spinnny is packed in its bucket and the sheets and halyard are attached you will note that the halyard hangs all over the jib sheet if the spi is on the leeward side and flops around the mast, into the mainsail or the crew's face if the spinnny is to windward. By taking some slack in the halyard and passing it in front of the shroud and then hooking it over the hook at the front of the silver cleat and finally laying it into the black clam cleat and putting the whole thing under tension the spinnny halyard effectively runs up along the shroud and is out of the way until you take it from cleat and hook just before hoisting.

The silver cleats are a must for fore-and-aft pole adjustment. The windward sheet is passed under the hook and then cleated when the pole is in the desired position. By having this cleat at the shroud, it is easily adjusted by skipper or crew (while hiking if necessary!). The HA 4077 cam cleats are useful if you intend to pre-cleat your spi and if you want to keep slack out of the system when the spi is not in use.

Note: In recent years, we have also added one CL204, mounted to resist forward tension in the rope to be cleated, (*see attempted addition to diagram above*) on the deck beside each side of the mast. Here we can cleat the sheet of a stowed spinnaker that leads up to the bow. In this way we can tension that sheet to remove excessive slack without pulling the corner of the spi onto the foredeck.

4. Installation

The above diagram shows locations of necessary fittings. You should note the following, however: the outside CL 204's shown should be mounted to cleat under outward pull, the inside pair, under forward pull. CL 217 & 218 need the longest, strongest possible screws and should be in from the edge of the deck far enough to ensure that screw ends don't end up outside the topsides the through-deck blocks will require rectangular deck cuts far enough from the rubrail that you don't interfere with the topsides which angle inwards.

Threading one continuous sheet: Assuming that the spinnny is in its bucket on the port side under the foredeck, tie one end of sheet to the port clew of spinnny. Then feed the loose end in front of the port shroud then turn aft and feed into port through-deck block, return through port cheek block on thwart, go across thwart (in front of the mainsheet!) into other cheek block and aft where you come up through the deck block, forward outside of starboard shroud, around forestay and back into the bucket, attaching the loose end to the starboard clew.

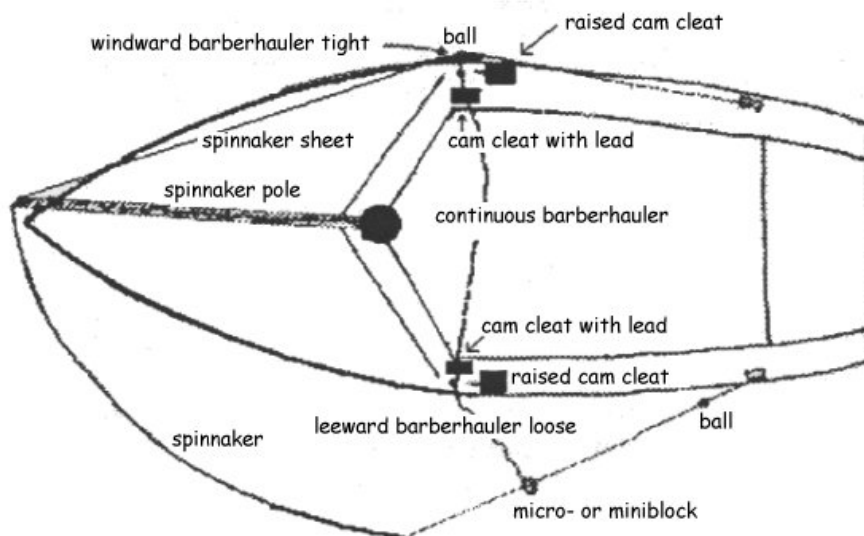
5 The "balls" system for improved spinnaker sheet control

This initially complicated but ultimately very handy spinnaker sheeting system was first noted on some of the UK boats in the '89 Worlds at Vallensbæk in Denmark where its heavy air potential could be easily appreciated. A year later, it was outlined in the Danish *W-Nyt* by Poul Ammentorp (W239), and I shall try to summarize and update this system here.



The "balls" system requires a barberhauler (henceforth referred to as BH) arrangement for the spi sheet plus a pair of plastic balls threaded onto the spi sheet which are kept in the forward ten feet or so of each sheet end by means of a suitable blockage such as a whipping.

On "Shades", we use 6 mm. spi sheets that have a nice soft, fuzzy covering over a Spectra core (Marlow Ropes #LM0113, described as "SPI NNAKER T/BLE 6mmPI NK"). At last report, this was unavailable in Canada, and we ended up getting a 100 m. roll of it through Mike McNamara. The reason we love this stuff is that we can simply remove the covering from the last 3 meter (10') or so of each end of our continuous sheet, and then needlewhip the remaining cover into a position where it makes a perfect blocker for the ball!

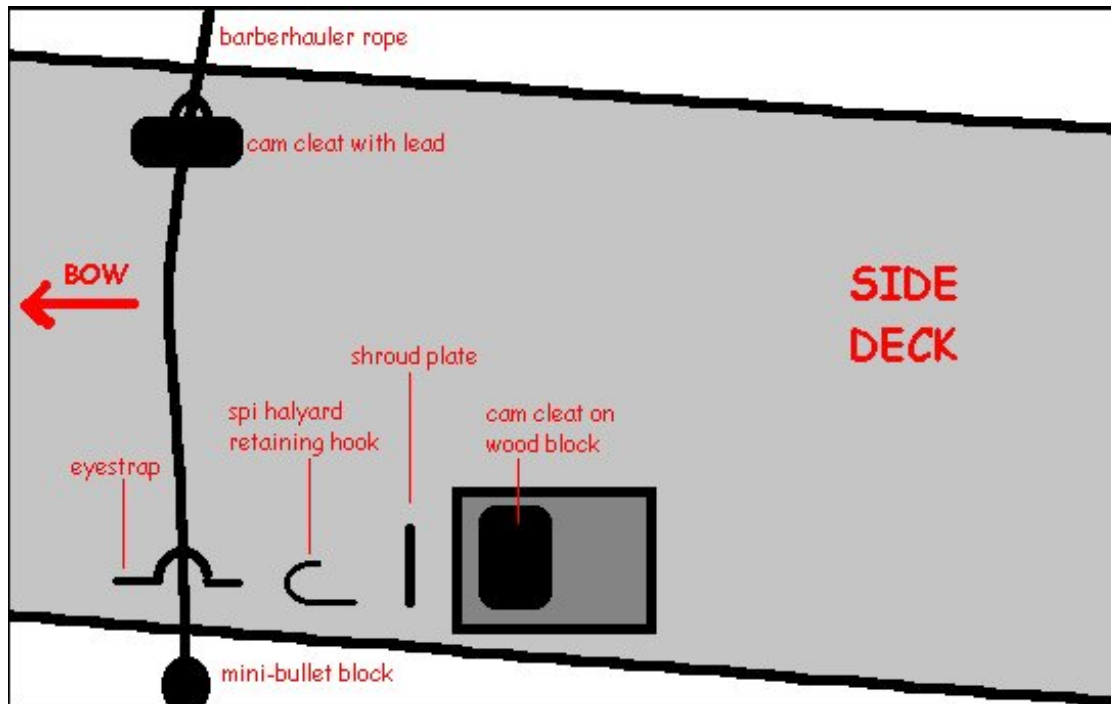


If you look at the illustration above you will see how our boat would look on a starboard tack spinnaker reach. When the spi is flying, the windward BH is always sheeted and cleated in, while the leeward one is usually loose (but can be tightened to varying degrees, especially on a wild run to dampen dangerous spi oscillations!)

In the diagram, the ball has slid as far aft as our whipping on the sheet will allow it to go, and when the ball hits the BH block which is held in position by the cleated BH, the windward sheet can run forward no further. The trick of course is to place the whipping such that the spi pole will set just off the jib luff when the windward BH is sheeted in. (What you need to do to locate the position for the whipping that blocks the ball, is mark the spot where the sheet would pass through the BH on a typical close reach. In our case, we left a little extra sheet at each end because we tie our sheets on. We can always use up more sheet to tie the knot, but too little would make life difficult!!). In the situation shown in the diagram above, the windward sheet does not need to be cleated, which saves one step during the reach set procedure! To move the pole further aft is no problem: you simply pull aft as usual and then cleat. We do this just aft of the shroud (see below) and have discovered that the cleat must be raised so that the sheet, on its way to the BH, does not angle up. Letting it angle up makes the sheet uncleat itself!

Note the following components of our system:

our barberhauler is continuous, i.e. it runs right across the boat and both sides can thus be adjusted from windward. It consists of about 3 metres of 4 mm 8-plait pre-stretch rope. This has a Harken mini-bullet block hitched to each end, after passing through four eye-straps, two per side, as shown below in the diagram of our rather crowded side deck area near the shroud.



- two cam cleats with lead,
- two cam cleats without lead
- two eye straps
- two plastic balls (we use red and green, RWO #R1993, R1994)

1.5.2 Spinnaker pole control

1 pole

The pole is to be (no more than) 198,1 cm (6' 6") from the ends of the fittings.

It controls the height of the foot of the sail and the angle of tack of the sail to the wind.

For racing it is handy to carry the pole along the side of the boom by installing some short loops wire or plastic pipe to each side of the boom. The front of the pole is then held in place by the uphaul/downhaul arrangement. The crew can quickly grab the pole to fasten it to the guy and the mast.

2 pole uphaul/downhaul

The downhaul is run through the deck just in front of the mast through a block at the bottom of the mast step leaving about a meter of control line free. Fasten 3 à 5 meter (10-16') of shock cord to this line to keep it tight and to provide some downward tension on the pole. One arrangement is to run this cord up the inside of the mast. Another is to run it across the floor of the boat beside the centreboard to the back of the cockpit. A longer run works better. Take it to the back of the cockpit, through a block, then back to the mast step. Keep it beside the CB housing where it will be out of the way or possibly under the floorboards in a Mark-1 boat.

The uphaul line runs up the front of the mast to a minimum of spreaders height, or can be taken as high as just below the jib halyard block on the mast where it passes through either an external block or better, an internal block into the mast. It then runs down to near the mast step (the external line will need a second hole through the deck just in front of the mast) through a block, then back under the thwart where it passes through an eye and a cleat. This must be convenient for the helm to adjust while sailing. Mark the uphaul with the usual positions for light and heavy wind.

The uphaul/downhaul is fastened to the center of the pole by a ring or rope loop. The best arrangement is to have a plastic "ramp" on the side of the pole which has a slot in the middle for a loop of line which is part of the uphaul/downhaul. When setting the pole, rotate it 45° till the ramp is on top. Then fit the loop into the slot in the ramp. Rotate the pole back by 45° trapping the loop in the slot. This is simple and keeps the uphaul/downhaul securely in place. Connect a trip line between the pole end fittings to release the guy when gybing. Be sure to trap the uphaul/downhaul line inside this trip line so that the pole can not be lost overboard.

3 Use and Control

The spinnaker pole uphaul has to control the height of the pole and needs to be adjustable. There are various ways of attaching it to the pole. The most suitable depends upon where the pole is stowed when not in use. If it is stowed on the boom, then a "keyring" or loop system is best. If a key ring is used, then stopper blocks should be mounted on the sides of the pole on either side of the centreline, so that has only to be twisted through 90°. (*Fig. 2a*)

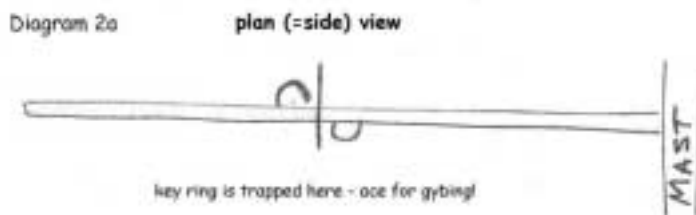
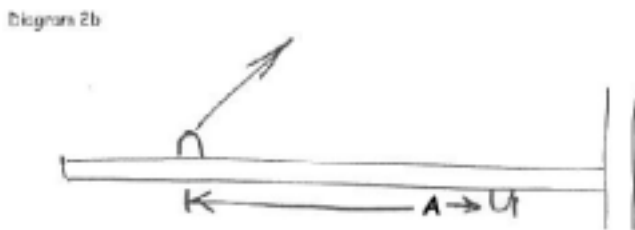
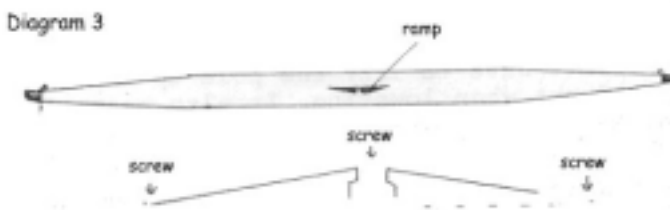


Fig. 2b shows the uphaul attachment points about 2/3 of the length of the pole out from the mast. Some sailors use this system as it makes the uphaul proportionally longer and lets the pole lie parallel to the boom when stowed without further adjustment of the uphaul. But distance A is long and causes problems on gybes because the pole has to be slid out and twisted 180° to get the key ring past the other uphaul attachment.



A better alternative to this system is to use a rope loop at the uphaul/downhaul junction instead of the metal keyhole fitting. This means fitting a ramp at the centre of the pole. When the pole is launched, it is simply slid out. The loop slips up and over the ramp and catches in the centre groove of the ramp. It can be left there during the gybe and the pole only has to be twisted through 90° when it is being retrieved. Super Spars or Proctor Masts can supply the "ramp", or one can be made from tufnol. (*see diagram 3*)

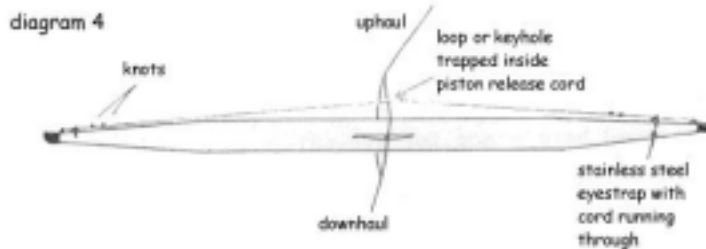


With either of these systems, it is important that, when stowed, the spinnaker pole does not fall off the boom. The best idea is to push its aft end into either a 3" diameter plastic drainpipe or a stainless steel loop which should be positioned 183 cm (6'0") from the gooseneck. It is also a



good idea to fit plastic clips (such as Holt Allen HA238) at the forward end of the boom to hold the uphaul/downhaul and prevent the pole from shooting forward.

10 cm (4") from each end of the pole itself, a stainless steel eye should be screwed to the top of the pole at right angles to the pistons. The piston release cord should be led through these with a couple of knots beyond (see diagram 4). The loop or key ring is thus trapped, and therefore cannot twist off the end of the pole, while the knots help the crew to get a grip on the release cord.

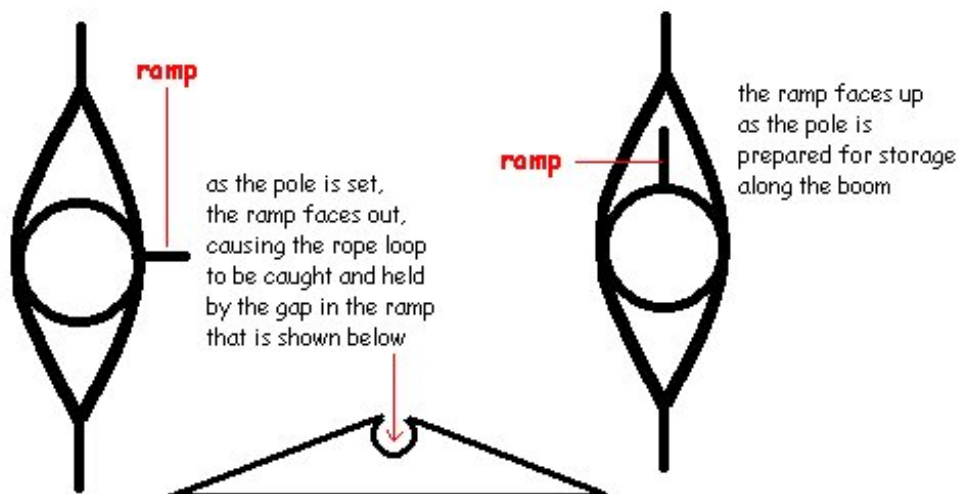


If the pole is stowed inside the boat, then the traditional system of using knots in the uphaul/downhaul is adequate. These can then be wedged into V-cleats at the centre of the pole when in use.

Ultimately however, the advantages of stowing the pole along the boom far outweigh its single small drawback of extra weight on the boom. When the pole is not permanently attached to the boat, it is in fact quite easy to lose the pole altogether, say, after capsizing. And poles are rather expensive.

For adequate pole control as you fly your spinnaker, you will need:

- 1 "reaching hooks" or the "balls system" (see p.) to help hold the pole down and to keep the windward sheet off the crew's neck.
- 2 a spi pole ramp, Holt-Allen 357, which is a very oblique-angled triangle with a gap at its apex that will 'capture' the rope loop as you slide the pole through the loop to set it. This ramp is attached in mid-pole on one side of the pole and will very nicely hold the uphaul/downhaul in position, even during gybes, until you choose to rotate the pole a quarter turn after taking it off the mast and before storing it (see diagram below)



- 3 the pole eye that came with your mast is set lower than optimum position. You may wish to add a second eye about 68,6 cm (27") above the lowest black band so that your pole can make the most of its 198,1 cm (6'6") maximum length.



4 correct pole height

The pole height adjustment is small. Typically, the end of the pole should be 23 cm (9") above horizontal in light air and 30 à 40 cm (12-15") above horizontal in heavy air.

The luff of the spinnaker should curl evenly as the boat heads up when the pole is at the correct height. If the lower luff curls first, lower the pole. If the upper luff curls first, raise the pole. Another indication of correct pole height is that the tack of the sail is at the same height as the clew.

Setting, gybing and taking down your spinnaker pole are best done easily and fast. This is especially true in a blow where every second that the crew weight is forward brings increased risk of a swim.

5 Storage

Fast pole manoeuvring starts with handy storage. Your pole should be stored along the boom while being permanently attached to the uphaul/downhaul system by means of a rope loop. For this, you need:

- 1 stainless steel wire or plastic loops on each side of your boom about 167,5 cm (5'6") aft of the mast to support the aft end of your pole in storage
- 2 a rope loop (a bowline not too much bigger than the circumference of your pole, tied into the end of your uphaul will do nicely!) This loop should be inside the string which connects your two pole end fittings.
- 3 The string connecting the end fittings should pass through a small eye strap fitted across your pole about 7,5 à 10 cm (3-4") from each end fitting. This keeps the loop from sliding off the end of the pole in its stored position.
- 4 To keep those 7,5 à 10 cm (3-4") from sticking out past the mast, attach a plastic hook (e.g. Holt-Allen 148 or 248) with the open end facing aft, to each side of the boom near the gooseneck. Insert the downhaul into one of these hooks during storage.

A system where the pole set from its storage position along the boom by a simple pull of a rope and then clipped onto the mast, is very popular with the Fanshawe Fleet. If interested in the details, contact Scott Town at (519) 672-5505.

1.5.3. Rigging the spinnaker

Handling techniques and equipment:

The important things to remember here are:

- to get the sail as flat as possible which keeps the angle of attack shallow as well as opening the leech to leeward to stop the mainsail backwinding
- to keep friction down to a minimum in the control lines set-up

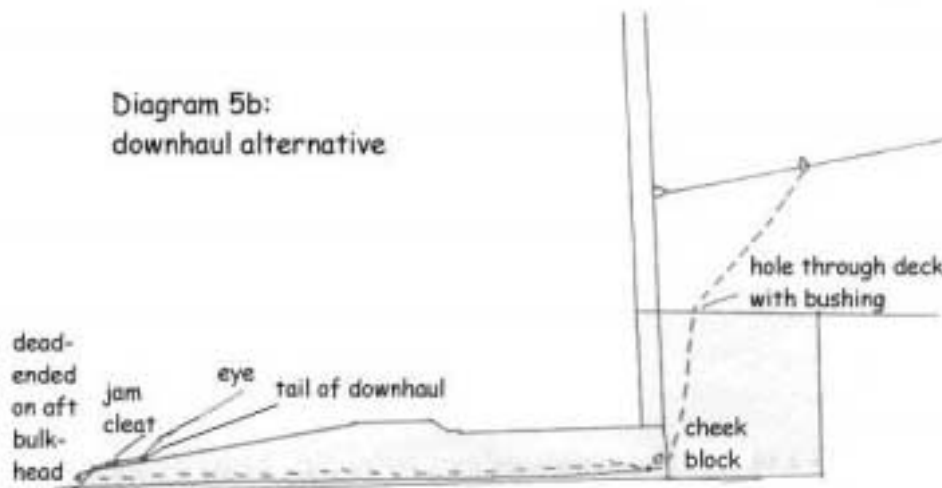
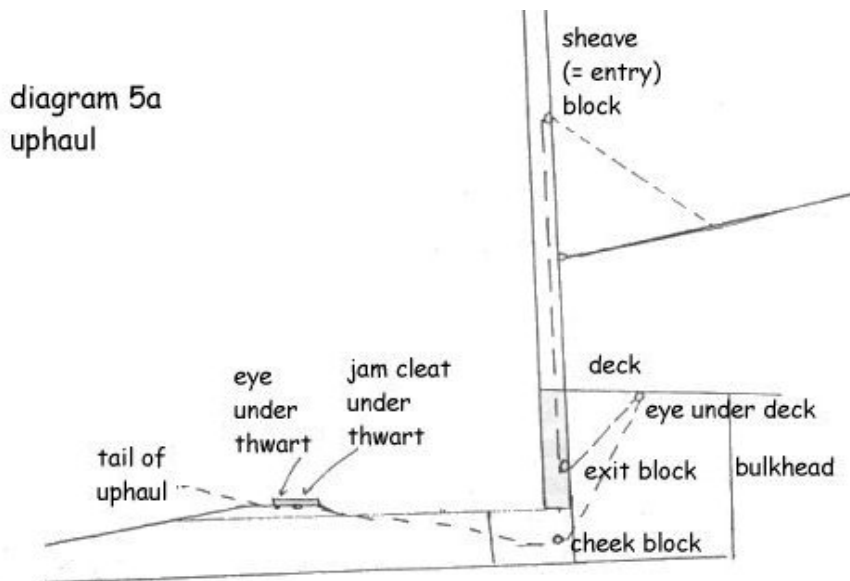
To get the spinnaker as flat as possible, it is necessary to organize the sheeting and pole position. The spinnaker needs to be hoisted as high as possible. Do not tie a knot in the halliard just above the head to keep the head away from the mast. A knot could also jam in the halliard exit sheave. Incidentally, the pole should always be clipped on to the mast eye with the piston part uppermost. This means that the crew doesn't have to lift the pole up and over when setting, or up and out when lowering. It also means that the spinnaker sheet is running over the solid part at the outer end, and not the piston.

The way to find the best pole height for your spinnaker is to hoist the sail. Clip the pole onto the windward sheet and slide it forward until it touches the spinnaker clew. Now raise the pole at the outer end by pulling on the uphaul until a vertical crease appears from the centre of the head. This means that the sail is too flat and the edges have overtaken the middle.



Then lower the pole to re-tension the leeches just enough to make the crease disappear. That is then as flat as that spinnaker will ever set. In fact it will be rather too flat for light winds, especially when running. Then more leech tension is needed to hold the air in, and to keep the sail flying. In those conditions therefore, lower the pole a touch further. You should find that the outer edge of the pole needs to be 20 à 45 cm (9-18") above the horizontal.

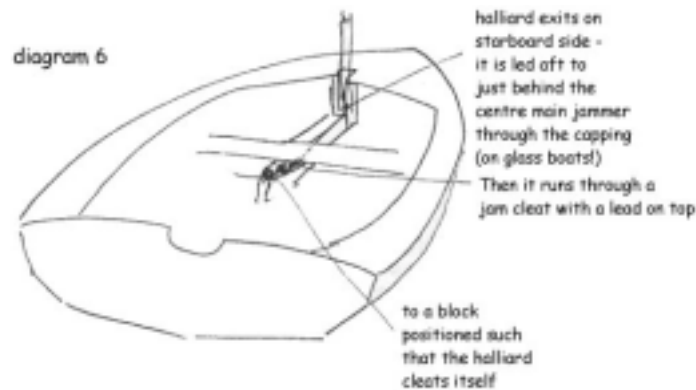
It is very important that there should be no play in the system when the pole is in position, for there is nothing worse than a pole waving about, making a mockery of leech tension²³. Since elastic must be incorporated into the system, you should therefore make sure that the elastic comes only as far as an eye in order to lock things up. The elastic must be in the downhaul part so that the spinnaker does not have to support the weight of the pole. *Diagrama 5a and 5b* show typical layouts.



²³ Al Schönborn's note: You must however, put a bit of slack into the system any time the pole needs to be moved onto or off the pole eye on the mast!

Usually it is only necessary to adjust the uphaul part as the elastic below takes up any slack when the uphaul is eased off and the pole lowered. Then the downward pull of the sheets keeps the pole from skying. When reaching, you can re-tension the uphaul, stretching the elastic to its knot, and raising the pole to its reaching position.

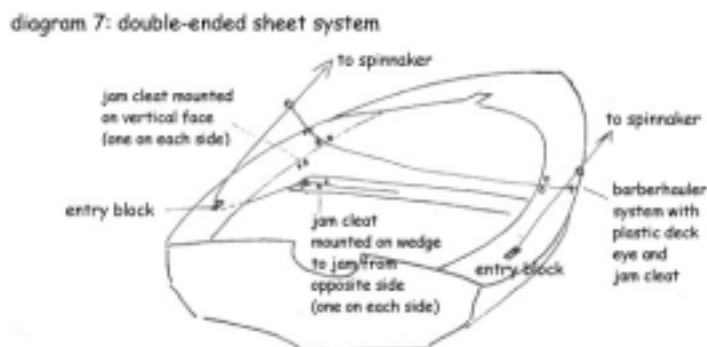
The spinnaker halliard should be led back to the helmsman on the starboard side, to a block and cleat near the back of the centreboard case. (*see diagram 6.*)



Care should be taken to get the correct positioning as the helmsman will have to hoist whilst steering with the tiller between his legs. With the mainsheet cleated, and yards of halliard to pull, he will have more than enough to deal with. It is also important to get the positioning of the turning blocks right. The sheets from the spinnaker should lead aft to through deck blocks (such as HA 4701), mounted just forward of the aft bulkhead. They should then be led forward under the side decks to the thwart.

At the thwart, two systems can be used:

- A turning block such as HA 4978 can be fitted underneath the thwart. After running through this, the sheet can emerge up through a deck sheave such as HA 4910. This should be located about 40 à 50 cm (16-20") from the side of the hull. Cleats should be positioned either at the side or on blocks at each end.
- If the sheet is to be kept above the thwart, the turning block should be mounted level with the inside face of the side deck. Jam cleats can then be mounted on this vertical inside face of the side deck, and on blocks on the thwart on the other side of the turning block (see diagram 7)



The windward sheet will need controlling on the side deck near the shroud. The simplest system is to use RWO clamcleats such as 217Mk1 and 218Mk1. Alternatively, a barberhauler system can be used. With the barberhauler system, the sheet runs through a block which is attached to a line running down to a deck eye and cleat, and which is continuous to the other side. The particular advantage of this system is that it can be pulled on quickly by either helm or crew. Also, in very strong winds, both sides can be partially tensioned to damp down the spinnaker. It



also stops the leeward sheet from looping itself over the end of the boom when the sheet is flapping.

1.5.4 The spinnaker shape and trim

The Wayfarer spinnaker is often regarded as the glamour sail and can cause more problems than either the main or the genoa. These problems stem partly from its spherical shape, partly from an apparent lack of control (just three rather thin control lines), and partly from an inherent fear that spinnakers are dangerous flappy things that cause capsizes. True, the sail can be hard to hoist and to set properly, but when handled correctly, the spinnaker adds much to the sheer exhilaration of offwind sailing. It gives extra speed to enable the boat to surf further and faster on waves that otherwise would be missed. It increases the importance of the crew whose spinnaker handling can make a real and obvious contribution to boat speed. Finally, with colour schemes and panel layout, it also allows a measure of individuality to be expressed.

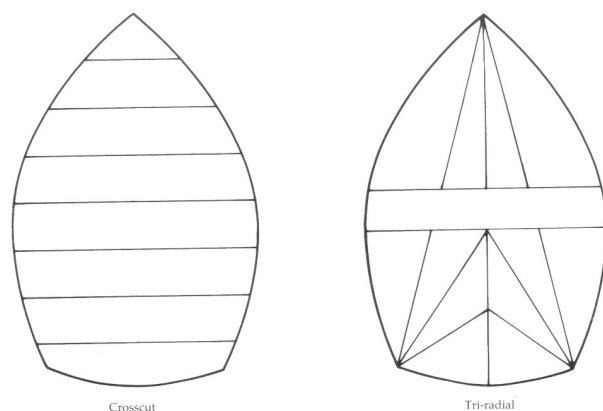
Just as with the other two sails, it is necessary first to see how the sail works, and then, by careful preparation ashore and correct use afloat, get the spinnaker to do its job properly. Like the fore and aft sails, spinnakers are most efficient when reaching and broad reaching with the air flowing over both surfaces. On the run, when just one surface is used, it simply becomes presented area.

This is demonstrated at open meetings. On the run, the boats with spinnakers often do not seem to gain on those without. Although at times, the extra area can just get the boat to plane, making the difference a little more marked. However, all this changes on a reach when the spinnaker boats, as they leap onto the plane, leave their less well endowed sisters wallowing behind.

Spinnaker design and shape

The principle of spinnaker design is simple as the sail has to be symmetrical about its vertical centre line. The more curve to that line, the fuller the sail, while the less curve, the flatter the sail. It is in fact, a segment of a circle, and so, the bigger the sail, the greater the arc. This consideration has in fact led to a decrease in the cross width area of spinnakers. It has been found that a smaller, flatter sail can be more efficient, even on a run because the edges do not have to be tight and the air can escape more easily. It also means that the sail can be flown on closer reaches without collapsing since the flatter angle of attack lets the air accept the leading curves more easily.

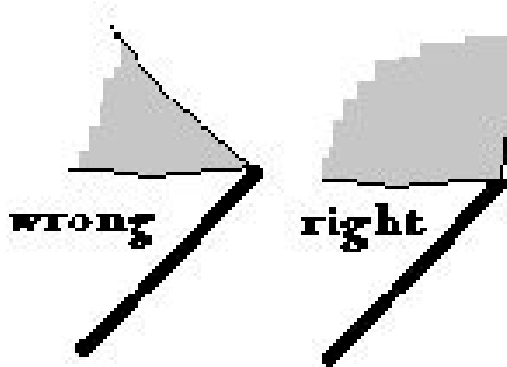
The most popular panel layout is the Crosscut design where the panels run horizontally. Since they leave the centreline at right angles and overlap at the edges, fullness can be created. See the diagram right. The particular advantage of this system is the fact that the number of panels is kept to a minimum. Thus, the sails are light and at the same time, the flow can be positioned accurately.



Unfortunately however, the upper leeches are prone to stretch where the cloth thread lines are across the bias. For this reason a range of well resinated cloths have been developed. By blocking the pores between the fibres, the resin prevents the weave from becoming distorted. HST 46 and Dynac are excellent examples of this type of material. A tri-radial design copied

from keelboats has been increasingly used in recent years. The idea behind this construction is that the threadlines of each panel radiating from the three corners take the load along their axis. The particular advantages of this design are that the sail lasts a long time and performs especially well in a breeze. It is rather heavier than the crosscut and the extra seams can be prone to snagging.

The windward part of the sheet should be marked at one of the cleats so that the pole sets just off the forestay. Another mark, on the leeward part, will pre-cleave the spinnaker for a close reach. These marks are helpful in keeping the pole off the forestay and the spinnaker leech from being overtightened.



Overtightening the spinnaker leech congests the slot between it and the mainsail and the force from the spinnaker is then exerted at right angles to the "keel", contributing little to speed but a lot to heeling! Oversheeting is in fact a major problem when flying a spinnaker.

Fearful of wrathful comments from their helmsman, many crews will oversheet the spi, simply to stop it from collapsing. What they should be doing in fact, is just keeping the leading edge from collapsing, just so that it is on the verge of curling back at approximately half height. In other words, the object is not to pull the sheets, but rather the reverse, to keep easing and easing. The crew should be trying to get the clews as far away from the boat as possible. Don't worry about getting the two clews at the same height, except perhaps on a run (when it comes almost automatically). So, if the spinnaker doesn't collapse on a reach at least once, then it has been oversheeted and is being kept too close to the other sails.

Since the helmsman is constantly altering course to make the most of wind and waves, the crew will have to play the spinnaker all the time. The helm may be able to help with an occasional pull on the windward side.

1.6 Sail control

1.6.1 Wayfarer tuning guide

Tools required:

- Long tape measure
- Short tape measure
- Straight edge - (a Sail batten is ideal)
- Thin line
- Rig tension gauge

Step by step guide

Spreader length and deflection - With mast flat on the floor set the spreaders to the following measurements:

- Length (measure from mast wall to shroud) 50,8 cm (1' 8")
- Deflection (measure from luff groove to straight edge across spreader ends) 20,3 cm (8")



Stand the mast in the boat with the shrouds in position. The mast should be hard up against the heel pin but without the tabernacle pin in position.

Pull up the genoa and pull on the required rig tension. This should be measured on the shroud with a tension gauge. To achieve the necessary tension a highfield lever, muscle box or cascade system must be used. Desired rig tension 155 kg (340lbs).

Measure the mast rake. Pull a tape measure up to the top of the mast. Lower or raise until 586,7 cm (19' 3") comes to the middle of the gooseneck black band. Fix the halyard at this point. Take the tape measure to the back of the boat (under the traveller if fitted) and read this measurement. If there is no traveller, read to the top of the cut out on the transom for the tiller. Desired mast rake 713 à 719 cm (23'5" - 23' 7") (as a rough guide, the more upright the mast the faster the boat will be off wind, this though will be detrimental to your upwind speed. Achieving the correct rake must be a compromise)

Problems:

Rake too much (mast too far aft) - move the pins in the shroud adjusters up.

Rake too little (mast too far forward) - move the pins in the shroud adjusters down.

If you do have to move the shrouds, go back to item three and start the process again.

Does the tabernacle pin fit through the hole without touching the sides of the mast.

If not ask yourself the following questions:

When you push the pivot pin through the hole, does it jamb against the front or the back of the mast?

Back - Move the pin in the mast foot forwards

Front - Move the pin in the mast foot forwards

(If the holes in the mast foot give too big an adjustment, use a five pence piece to give fine adjustment).

The final thing to check is mast bend.

Pull the main halyard tight against the mast next to the gooseneck. Now measure from the back of the mast to the halyard at spreader height. Desired measurement - 4 cm (1½")

Too little bend - move the spreaders back

Too much bend - Adjust the spreaders forward.

(Note - only small adjustments will be required.) If you do have to alter the spreader positions it is recommended that you go back to the start and recheck all measurements. If you do have any problems all you have to do is give Porters a call, or send us an e-mail, we hope to be able to provide you with a sensible solution!

1.6.2. Quick summary of Wayfarer "magic" numbers

Mast

- rake: 713,7 à 716,3 cm (23'5"-23'6"), boom should hang level (parallel to water) with no tension on mainsheet 706 cm (23'2") in survival conditions: boom angles down towards transom)
- spreaders: length (mast wall to tip): 51 à 52 cm (20-20½") angle (tip to tip) medium wind: 96,5 cm (38") (less in light, more in blow)



Mainsheet

- thickness: needs to be only about 7 mm (¼") which will run very nicely through Harken 082 (bullet) blocks
- length: should only be about one foot longer than length needed to allow boom to touch shroud on a run while bridle is at its flattest setting - anything more is waste and creates tangles with other ropes (e.g. spi halyard).

Vang

Should be a powerful system that can easily be adjusted by the helm while sitting out on either side of the boat. Ours is about 40:1; 12:1 is the minimum needed for efficient adjustment while racing!

Outhaul

Should be reasonably easy to adjust while racing - ours is 4:1 and controls run to both sides. Basic setting is for maximum foot depth - progressively less foot depth as boat becomes overpowered or backwinding is a problem. Flattest setting is used on a run and in drifters or survival.

Halyard

2mm (3/32") wire looped over a halyard rack, Holt-Allen HA345.

Genua

On Shades:

- jib halyard is 3mm (1/8") wire looped over the hook of a magic box
- the jib is (almost always) sheeted to a point
 - 52 cm (20.5") from the middle of the centreboard slot
 - 8,9 cm (3.5") from the forward edge of the centre thwart
- rig tension, which comes from the jib halyard, should usually be just enough to remove visible slack from lee shroud while sailing close-hauled

Note: An even more functional approach to rig tension, i.e. jib halyard tension 99% of the time, is to crank on excessive tension and then do the one really important test:

Sail close-hauled and see if your sailing groove is wide enough. If there is not enough (fore/aft!) curve in your jib entry, your sailing groove becomes too narrow, i.e. the number of steering degrees between luff and stall becomes so minute that your tickers will indicate luff one second and stall the next with very little change of course. What is happening in this case, is that instead of flowing along both sides of the curved surface of your sail, the wind is alternating between bouncing off the windward and leeward sides of your sail entry (which is disastrous to your performance!). A jib luff entry becomes too flat because the halyard is too tight. What we therefore do is overtension the jib halyard for the conditions, test our upwind ticker performance and then decrease halyard tension until the tickers settle down - i.e. we are in the right groove (enough curve in the luff entry) for the conditions.

If at any time during the race, I find that it is getting uncomfortably hard to steer by the tickers, I immediately ask my crew to decrease halyard tension a bit. Another case of: When in doubt, let it out! Of course it is also true that the more rounded your entry, the lower you will be able to point. Thus you only want the entry as rounded as necessary to feel comfortable with your tickers!



1.6.3. Sail setting guide

Light winds: crew sitting in		
	flat water	Chop
rig tension	Medium	medium slack
jib sheet tension	fairlead forward sheet eased	fairlead well forward sheet medium eased
Main sheet tension/ boom end position	boom eased leech eased	boom eased leech eased
Cunningham	Nil	Nil
Kicker/vang	very light tension ²⁴	Light tension
Main foot tension	very tight	slightly eased
Mast bend	no chocks pre-bend	slightly chocked pre-bend
Sailing trim	minute heel weight forward	minute heel weight forward

Medium winds: crew on the rail		
	flat water	Chop
rig tension	medium tight	Medium
jib sheet tension	fairlead middle sheet medium	fairlead middle sheet medium
main sheet tension/ boom end position	boom inboard leech medium	boom slightly eased leech medium tight
Cunningham	nil to minute	nil to minute
Kicker/vang	moderate tension	medium tension
main foot tension	slightly eased	well eased
mast bend	very chocked mast straight	very chocked mast straight
Sailing trim	upright weight central	very upright weight central

²⁴ Uncle Al's note: we never use the vang going upwind in light airs. I believe Mike is referring to vang use on reaches and runs: just enough to keep the boom level to the water



Breezy winds: spilling wind/overpowered		
	flat water	Chop
rig tension	very, very tight	very tight
jib sheet tension	fairlead aft sheet medium	fairlead middle sheet medium
main sheet tension/ boom end position	boom out leech very tight	boom out leech tight
Cunningham	Medium	Medium
Kicker/vang	Tight to very tight	very tight
main foot tension	Tight	Tight
mast bend	chocked mast bent	medium chocked mast bent
Sailing trim	upright weight central	upright weight aft

1.6.4. Looking after your new sails²⁵

We recommend that you roll mainsails and foresails rather than fold them.

The mainsail

It is best to leave the battens in and the idea is to slide the mainsail foot along the boom, leaving the rest of the sail rolled until you are ready to hoist. The reverse procedure can then be followed when you come ashore. As you roll up the sail parallel to the battens, keep the material crease free. Be very careful not to pull out any folds or pleats along the tube you create. If they do occur, just unroll the sail slightly and shake out or smooth the creases and start rolling again.

The foresail

Unfortunately the PVC-coated luff wire is trying to straighten out and so rolling the foresail has to be done carefully. We prefer to leave the sail ties on whilst shackling the tack down and attaching the jib sheet. Then the wire can be uncoiled and the halliard attached to the head. Ashore, the sail should be taken down and rolled up again. This is best done by leaving the tack shackled on and the jib sheet pulled in reasonably tight. The sail can then be rolled around the luff wire. So please do not leave the sail hoisted, flapping between races.

The spinnaker

This should be flaked and then folded carefully into its bag after use. It is best not to leave it in the chute (spinnaker launcher for North Americans) for any length of time - especially with load on the patch. The sail should not be dried by hoisting and letting it flap as this stretches the edges.

²⁵ Michael McNamara, UKWA News #80/Winter 1998





2 Wayfarer racing

2.1 The pre-race warm-up

Picture the scene. It's a few seconds after the start. The smoke from the starting gun has barely left the transom of the Committee Boat. Stretching away down the line is a seemingly endless stream of Albacores all beating hard in unison. All apart from a few poor souls, that is. Some are always in the second or maybe even the third rank of slower, wallowing boats already falling behind. What can be done to improve their starting? Why are they always behind in dirty wind, having to plough through confused wash?

This is a common difficulty as even the best sailors sometimes make a mistake and start at the back. Luckily, the knack of making consistently good starts can be learnt. But to see why some people haven't yet caught on, we have to go back a bit - back, before the start, back even beyond the Warning Signal. These were (probably) the sailors sailing aimlessly about, not doing their warm-up exercises - not the sort of warm-up necessary in athletic sports (although there are some who say that sailors should warm up their muscle groups before the race). No, the warm-up we mean here is getting used to the conditions. So that both the crew and boat are in sync with their environment and can give it their all from the start. This will involve going through a series of simple exercises:

1. By sailing hard on the wind on each tack for a few minutes, it is pretty usual to note how the boat's heading alters as the wind shifts, etc. However, this routine should also be used to get into the rhythm of the waves and wind. The sailors should be working hard at "feeling" what the boat is telling them, of course. They could even take it in turns to close their eyes to use other senses - but the other should keep a good look out!
2. There should be lots and lots of tacking, feeling how the boat is affected by the waves. Here, we are trying to find out what effect they have on the boat, and how long it takes to get going again if we stop. Because gybing is (usually) not needed until later in the race, it's not quite so critical but nonetheless a good few should be tried.
3. Acceleration is everything at the start. So, stop the boat, and then see how long it takes to get going back up to hull speed. This obviously varies with the conditions. If it is difficult to judge, then use a mark as a fixed point.
4. If we are early for the start, we may need to stop. How can we do this? Practice letting the sails out, backing the sails, moving aft. Luffing up (and therefore going over the line) will not be a good option. Then, see how long it takes to get going and what is the best way of doing it. Work at sheeting the sails, at heeling angles, etc.
5. By this time, the line should be laid. So, which is the best end to start? Work it out by sailing along the line, sheeting the mainsail perfectly to the wind. Then tack without altering the mainsheet and sail back on a reciprocal course. If the mainsheet has to be eased to get the main to set perfectly to the wind, then the end of the line you are sailing from is the paying end. If the main has to be sheeted in, then the end you are sailing towards is the paying end. Then go and make a few starts there just to see.
6. Practise your run up to the line, seeing how long it takes and the effect of waves, etc., but remember the actual start will have more boats about, so that getting there will be slower.

Whilst doing all these things, keep a really good lookout all around. It would be a great shame to damage your boat, or even worse, to damage someone else's because you were concentrating too hard on other things. Going through this routine gives you the confidence to go into the start knowing that you can spring into action instantly because you know what is going to happen.



2.2 Those last few seconds²⁶

Those last few seconds... Out of the many thousands of letters I receive, the majority are concerned with starting problems. It seems that many sailors get into positions where they find it impossible to recover. So, why don't we go through the routines?

Sweaty hands, racing heart, shortness of breath, weakness in muscles... sounds familiar? Of course it does. Rather, it will do to every dinghy racing helm. As those last few seconds to the start tick away - taking an eternity - we are assailed by all sorts of emotions. There's hope, of course, anticipation; even fear perhaps. They're all in there squirming away trying to drive us over the edge into raw panic.

That's the panic that causes us to oversheet, to pinch, to heel over, to stop, to forget our acceleration routines... in short, that causes us to make a bad start.

- 1 Yet we shouldn't have to feel like condemned people about to be shot. We should be able to control our destinies. All we need to do is follow the golden rules. They obviously aren't foolproof but they go a long way towards keeping things cool.
- 2 As those seconds tick away there is nothing that we can do about our position on the line. That was taken care of long ago when we went through our "checking which is the right end to start" routines. In fact, there are quite a few ways to find out which is the best end. The most simple and therefore the easiest one, is to sail along the line, sheeting the mainsail in as perfectly as possible. Once you've got that organised, tack but be careful not to alter the mainsail setting as you do so. As you sail away back down the line, check to see if the mainsail is set as perfectly as it was before.
 - If it is not, then one or other end of the line is the paying end.
 - If the mainsheet has to be eased, the wind is further behind, and the end you are sailing from is the paying end.
 - If the mainsheet has to be pulled in, the wind is further in front, and the end you are sailing towards is the paying end.
 - If the wind is shifting, you will have to check and keep checking. So don't sail outside the end of the line because it may be impossible to get right back to the paying end if the wind changes.
- 3 If it is obvious to you which is the paying end, then it will be obvious to everyone else. That leads to the fleet all ganging up together in one place. The result of this congestion is that the wind drops as it goes up and over the top of the mass, wash increases and confuses the wave pattern, and, worst of all, boats congregate early and as they stop, they raft up. If it is a big committee boat you can even run out of wind under it. So, I'm sure that as we know to our cost, it is only one or two boats maximum that get away. The rest all wallow in their dirty wind. Much better to be just away from the paying end. To leeward of the bunch, at the windward end for example, with all the luffing rights, etc. that gives you. Hidden from the race officer's eyes, you can nibble up to the line and be ready to bear away, accelerate and go as soon as the gun goes. O.K., so you've lost a few metres by being further down the line, but at least you're safe. Besides, the raft of boats to windward acts as a buffer against those poor unfortunate naive sailors who come down from beyond the committee boat hoping to find space. If it's the leeward end that pays, then this playing for safety is even more important. The timing to get this end right has to be so perfect that it just isn't worth the risk to start right next to the buoy
- 4 Never go outside the windward end of the line. As windward boat, you have no rights. Rule 18.1(a) is clear when it states that you are not entitled to water at a starting mark

²⁶ by Al Schönborn



surrounded by navigable water. Besides which, as you bear away hoping for a gap, it will already be closed and you're speeding up to a certain 720 or worse.

- 5 Try to keep speed on. If you have to hover, do so a few seconds away from the line. Then you've got a chance to build up speed before the hordes envelop you. And envelop you they surely will, if you try to hover exactly on the line. You will already have worked out how long it takes to get going in the conditions. So that is your guide to the safe hovering distance.
- 6 Practice your acceleration techniques and keep the boat upright, otherwise you will be in the dirty wind of the boat to leeward. Try to bear away as the gun goes to get a bit of speed. You can only really do this if, as you nibbled up to the line, you luffed up minutely from time to time to create a gap between you and the boat to leeward. Don't overdo this. Otherwise the gap will be spotted and will be filled by a boat coming in from behind, who then has rights over you because you're windward boat! How unfair can you get?
- 7 As the fleet comes up to the start line, the wind will drop all the way down the line. So ease kickers. Don't oversheet jibs. Don't sit too far forward (or aft). Then, as the fleet spreads out, bring the controls back on to their proper settings.
- 8 Keep a good watch out all around and get your crew to do the same, reporting in all the time. Crews should be doing the timing too. In big fleets, don't expect to hear the gun. There will be too much other noise and besides it is visual signals that count.
- 9 Don't try to tack too soon around the front of the committee boat. His anchor warp is dangling there desperate to entangle you. So, in your pre-start checks, have a look at the anchor cables at both ends.
- 10 If you've made a really good start don't blow it in the euphoria of the moment. Relax and get on with the race. But a small smile is permitted! If you've blown the start, don't panic - be consoled that everyone does from time to time. But you don't have to make a habit of it. Just get on with things - getting into the tacking routine as you hunt for clear air, keeping the boat moving. It is possible to make a comeback. After all, there is the whole race in front of you to do it. All it needs is patience. In club races, if you have the courage, try starting at the back just to experience the feeling. Then if it happens in big time stuff, you won't get so grumpy.
- 11 My favourite routine is to sail along the line on port, towards the right end looking for a gap to tack into. If you remember in Golden Rule No.5, there will be gaps being created all the time. All you have to do is find them!
- 12 It was Paul Elvstrom who said that "if you're not over the line once in every five races then you're not trying". Well, if that's your view too, be over the line in non-important races. But I bet that it will be the other way round!

Finally, if all else fails, keep your cool. There is a whole lot of race left to go.

2.3 Sailing to windward²⁷

Sailing to windward even in normal conditions is hard and demanding. When you have to do it in a breeze, it becomes exhausting, and in light weather, when that windward mark just refuses to get any closer, it becomes very, very frustrating. When you compare all that hard work with the glamour, thrills and sheer exhilaration of three sail spinnaker reaching, then it makes one wonder whether beating is worth all the effort. Of course it is, it even has its own strange fascination. The aim, of course, is to make the beat as short and quick as possible. The speed made good to windward is, in fact, a compromise between sailing as close as possible to the wind (pointing) and sailing as fast as possible through the water (footing).

²⁷ Mike McNamara, U.K. WAYFARER NEWS #50/Summer 1991



Some sailors have the knack to do this right from the word go – the understanding that they need constantly to trade the importance of one against the other, depending on what is demanded. Sometimes pointing high at the expense of speed and sometimes sailing rather lower, to go for extra speed at the expense of pointing. This perhaps, can best be described as having the “feel” of the boat. For those sailors who have to work at getting this feel there are certain invaluable guides to help them.

Wind tufts

When the sail is working properly, all three windward tufts will stream upwards at approximately 45°. The leeward windtufts will be parallel to the water. If the top windward windtuft collapses first, the leech is too slack. The solution is to sheet in slightly. If the bottom windward windtuft collapses first, then the leech is too tight. So ease the sheet slightly. Once all three are working together, then the helm can modify his heading angle depending on what he wants to do, knowing that the leading edge of the sail is presenting a constant angle to the wind.

- If he wants to go for speed, he can bear away just enough to get the windward tufts parallel to the water, being careful of course, not to bear away so far that the leeward tufts collapse or that the wind coming from further abeam, causes too much heeling over!
- If he wants to pinch a bit, he can feather up until the windward tufts go vertical or even flow towards the luff. Here he has to be careful not to luff up so far that the airflow breaks down and the tufts collapse.

Sometimes it is difficult to get the bottom windward and leeward tufts in sync. First the windward one goes and then immediately the leeward one collapses. This usually means that the leading edge is too straight and the wind finds it too easy to go from one side to the other. Slacken the rig tension slightly to give a touch of jib luff sag. You may not point so high, but you will go a lot quicker.

Steering

There is a nice simple rule to steering upwind. The helm is constantly moving of course, to keep the boat on track, but if the crew can feel the boat altering course, then it is too violent. Some say that you have to steer through or around waves but this is so hard to do accurately, that for most sailors, it pays to let the boat have its track and let the waves do their worst. However, if the boat hits two or three waves in succession, then bear away a bit, ease the sheets and get some speed before heading up again. Do not confuse “feel” with the tug of weather helm. Weather helm is the boat telling you that it’s in trouble and needs help. It’s probably heeling too much or the mainsail leech is too tight. Easing the main slightly and heading up minutely are often the answer. In most conditions, therefore, a neutral helm is the fastest. Unfortunately, it is also the most difficult to get used to.

Wash

Checking the wash is a good guide to speed. The smoother, the faster is the golden rule. In light weather, watch out for that leeward aft chine digging in. This shows up as a curling, turbulent wavelet to leeward of the rudder wash. Don’t forget to sit back in a breeze to get the flatter, more powerful after sections in the water and the veed bow out. Obviously the sailors have to move forward in lighter winds to get that transom out.

Anticipation

As sailors, we have to develop split personalities, as part of us has to concentrate on the here and now - coping with what the wind and waves are doing to the boat at that particular moment. At the same time, a part of us has to keep looking ahead to see what is about to happen. Will the next gust be a header or freer? Will this wave stop the boat and so on. This is where the crew



can help. and both sailors, by looking to windward can make their judgement as to what to do. Crews should be especially encouraged to give their views. This means that there should be plenty of chat about where the gust is and what it will do, etc. Even if the sailors are totally wrong, it doesn't matter. At least they know that the gust is coming and interestingly, after a while, the gusts start to agree with you!

Avoid the laylines

If your final approach for the windward mark is made too far out then you are liable to:

- The wind direction changing, which you can't take advantage of, as you are locked into the tack.
- Some rotten sailor coming across in front and tacking on you. So you have to tack and sail much further than you should!

The approach to the windward mark

This is often where many places are lost and gained. As boats start to converge, the wave turbulence increases and the wind becomes more chopped up.

So avoid getting to leeward if you possibly can, even if it means sailing out beyond the layline slightly. The extra distance sailed is more than made up by the extra speed.

Avoid approaching the mark on port if you can. There may be a gap in the starboard horde but more usually there isn't!²⁸ Finally, don't you dare hit the mark. It's lurking there ready to get you if it can. So plan to keep it at least a boom's length away!

Remember too, the faster you do the beat, the quicker you get on to those lovely reaching legs.

2.4 Changing gears²⁹

You are going well. The boat is flying and you are with the pack. Then, quite horribly suddenly, and often without your apparently altering anything, it all changes. To leeward, boats point higher and go faster, and the windward boats start to roll over you. So, what has happened? Why are things going wrong and what can you do about it? Firstly, don't panic. You were going well and can do so again, providing that you are logical. So, identify whether it's a pointing problem or a speed deficiency and then apply a check list of cures. Don't forget to alter one thing at a time only, and to give the change time to work.

You need to point higher

Q: Is the mainsail leech too open?

Answer, try tightening it by:

- increasing main sheet tension
- increasing kicking strap tension
- bringing the boom closer to the centreline

Use the angle of the top batten to the boom as your guide. Ideally, it should be parallel to the boom. The top windtuft should, in fact, be streaming aft most of the time. But stalling it, up to 40% of the time, should give the best pointing ability, although at the expense of speed.

Q: Is the mainsail too flat?

²⁸ Al Schönborn's note: don't forget rule 18.3 about tacking within 2 lengths of the mark - a rule which has come in since Mike McNamara wrote this

²⁹ Michael McNamara, UKWA News 1995



If the mainsail is too flat, the leech is likely to be too open and the slot between the foresail leech and the front of the main too wide. A good guide here is: If the main luff does not backwind in medium conditions from time to time, then the mast is too bent. Also, the sail can have large diagonal creases which in extreme cases will flutter.

Answer:

- straighten mast
- ease clew outhaul

Q: Is the foresail too full at the luff?

Identify this problem by luffing up rather more than usual to see if the whole luff length collapses at the same time. Increasing the rig tension³⁰ straightens out the angle of attack, it is possible to go too far and make the sail difficult to "read"³¹.

Answer:

- increase rig tension
- ease luff cunningham until luff has minute wrinkles
- move fairlead closer to the centreline

Q: Is the foresail leech too open?

This problem shows itself when luffing up more than is usual. If the top windward windtuft collapses first, tensioning the foresail halliard reduces rake, raises the clew and so tensions the leech.

Answer:

- sheet foresail harder
- move fairlead forward
- reduce mast rake
- increase jib halliard tension

Q: Is the Helm too neutral? Has it no "feel"?

Some "feel" is necessary to the helm in order to keep the boat on track when the helm is looking elsewhere. Up to 70% of windward concentration is spent in anticipating what changes in the environment are about to affect the boat.

Answer:

- increase mast rake;
- sit further forward;
- angle centreboard forward.

Remember, try one adjustment at a time, waiting a while to see if it makes an improvement.

You want to go faster

Q: Is the mainsail too full?

In a breeze the very best speed seems to come when the top quarter of the sail has very little curve and will seem almost straight when viewed from below. The top telltale will stream all the time.

Answer:

- bend the mast more
- tighten the clew outhaul

³⁰ Al Schönborn's note: = jib halyard tension

³¹ Al Schönborn's note: at this point, windtufts on both sides of the jib would become very 'jumpy' and you would have trouble settling into a groove where the jib is neither luffing nor stalling



Aim to make the sail inert in the gusts, so that it gathers rather than flaps.

Q: Is the mainsail leech too tight?

Signs that the leech is too tight are excessive and uncontrollable heeling in gusts, associated with sail being too full and so there could also be massive backwinding.

Answer:

- increase mast bend
- ease boom away from centreline on the main sheet/bridle/traveller

Q: Is there excessive weather helm?

This problem shows itself particularly in gusty conditions when the out of balance boat tries to luff into the wind as the gust hits. Keeping the boat flat and moving aft not only keeps the hull shape symmetrical but also makes best use of the fatter flatter aft sections.

Answer:

- keep boat level and do not allow it to heel
- reduce rake
- move crew weight aft
- raise centreboard a fraction

Q: Is the foresail angle of attack too shallow?

If the angle of attack is too shallow, the sail is not only difficult to read but the centre of effort goes aft. When this happens the bottom windtufts become unstable as first the windward one and then the leeward one stall out as the airflow rapidly fluctuates from one side of the leading edge to the other.

Answer:

- reduce halliard tension and/or
- reduce rig tension overall
- tension foresail cunningham
- move fairlead outboard

Q: Is the foresail leech too tight?

This shows as excessive mainsail backwinding and the lower windward windtuft collapses before the top one. Aim to keep the middle leech parallel to the centreline with the leech at 3/4 height being 5% - 10% open and the leech at 1/4 height being 5% - 10% closed. Tiny movements of sheet and fairlead adjustment have massive effect on the leech so don't overdo them.

Answer:

- ease sheet slightly
- move fairlead aft slightly
- increase mast rake

As a general rule flatter is faster, while a tighter leech improves pointing.

By working through these adjustments, it is possible to bring the boat's performance back on track. Don't forget to wait a moment after each adjustment to see if it helps.



2.5 The fine art of pinching³²

On "Shades, W3854", we have spent much of 1993 outpointing the opposition. I tended to attribute this to being in tune with my sails and my boat, more than anything else, until the weekend of the Clark Lake Invitational Regatta in late September. There, we sailed Tim Dowling's Rebel #4069 with a very competitive fleet, and once again, people were commenting on how well we were pointing. This caused me to re-examine the whole matter. As Wayfarer Class Coach, I am reporting my findings to you - for your perusal and possible comments and discussion. As I see it, there are three aspects that can affect pointing:

- boat and rigging set-up
- sail and boat trim
- helmsmanship

I now propose to briefly cover these three topics as they relate to pointing close to the wind to best effect.

2.5.1 Set-up

From stem to stern, the following are the essentials:

Jib Luff

The entry should be pretty well as flat as you can get away with. This is of course a factor controlled by jib halyard tension - the tighter the halyard, the flatter the entry (this assumes a jib luff sleeve that is not getting tensioned along with the halyard, i.e. that is not fastened to the luff wire at the tack). Beware, however, of conditions such as waves, where it is easy to overflatten the entry to the point where the steering groove becomes too narrow for the conditions and the windward and leeward tickers on the luff indicate both stall and luff at virtually the same time. If this situation is allowed to continue, you are doomed (to poor everything). As they say: "When in doubt, let it out!" In this case, let the jib halyard off until the narrow groove problem is alleviated.

Jib Leech

Using a needle and some real wool, thread a 7,5 à 10 cm (3-4") ticker through the folded sailcloth at the very aft edge of the leech, about $\frac{3}{4}$ of the way up from the clew. Proper use of this essential tool will require a window in the mainsail positioned so that the crew can see this windtuft while sitting out to windward.

Alternative: If you cannot see the jib leech ticker, then a good alternative is to have the helm steer according to the dictates of the lowest of your three luff tickers positioned at quarter, half and three-quarter height while the crew sheets in until the upper tickers match the performance of the lowers.

Jib Sheet Lead Position

Base position should be where a straight line from the halfway point on the luff through the clew would meet the jib track. A bit forward from this position gives a fuller foot when the jib is trimmed to best advantage, if you want extra power to punch through waves. And the reverse can be done in very flat water and lots of wind.

³² this is a re-working of an article Al Schönborn wrote for the Rebel Newsletter and the CWA Yearbook in 1993



Mast

Fore and aft bend controlled such that the mainsail entry is neither so full that it chokes the slot nor so flat that there are large creases from the luff towards the clew of the mainsail which in turn causes a loose leach and lack of pointing ability.

Boom Vang/Kicker

This must be powerful (ours is about 40:1, a lever supplemented by 6:1 purchase on the control lines) and easy to adjust at all times (ours leads to the helm on both sides of the boat).

Bridle

We have a bridle which can be adjusted. In my opinion, the crucial consideration is not to have a bridle that is too long and thus prevents you from putting the maximum tension that you can get away with on your leech. In my experience, main leech tension = pointing ability (But you must be careful not to overdo the mainleech tension bit either, especially in light winds!)

Mainsail Leech

As on the jib leech, thread a windtuft through the leech, about $\frac{3}{4}$ of the way up from the clew. Mainsheet Swivel Block: This should function smoothly. On "Shades", it is the single most frequently used piece of equipment, i.e. the mainsheet (3:1 purchase, 6mm ($\frac{1}{4}$ ") softbraid) is cleated or uncleated every few seconds throughout the race. It must be designed and positioned such that it will not cleat itself accidentally!

2.5.2. Trim

After all the many conditions under item 1, Set-Up, the good news is that trim is very straightforward, as it must be. The adjustments are simple but do need constant attention: boat trim. Under most circumstances, boat trim is simple: keep the boat flat in every direction. i.e. don't let it heel enough to cause helm, don't plow the bow or drag the transom (for the latter, cheek wake for excess turbulence which is alleviated by moving crew weight forward). For short periods of time, heeling the boat to leeward can help you point better. This can be useful to help you pinch up around a mark or escape someone's lee-bow.

Jib Trim

We simply sheet in until our leech ticker (= windtuft) starts to get sucked in to leeward of the leech. The further forward our leads are, the looser the sheet will be when this occurs (for any given wind strength).

Main Trim

We normally only use the mainsheet which we sheet in until the leech ticker starts to get sucked behind the leech. For reasons unknown, this ticker sometimes will not fly properly, in which case we revert to the time-tested method of keeping the top batten roughly parallel to the centre-line of the boat. If we get overpowered, consistently or by a puff, we crank on the vang. Since the leech ticker will always fly aft in these conditions, try to use enough vang to keep the upper batten parallel to the boom.

I find that we gain more than at any other time in puffy conditions. I am convinced that this is because we make extra effort to maximize the benefits of a puff and minimize the damage from a lull. My crew is always ready to sheet the jib in a bit more when a puff is imminent, since the leech ticker will allow this. And, of course, the reverse is most definitely true when a lull hits. The faster the reaction to change, the greater your benefits. For me, the effects are even more easily felt as I crank in the mainsheet in response to a puff until the leech ticker says 'stop'. The



bow is pushed to windward a bit and we move out on any who are slower to take advantage while they bask in the rosy glow that goes with the knowledge that you got a good puff.

Even more dramatic is the way the competition can be positively devoured when you are faster than the boat beside you to adjust to the dreaded dead spot. Everything off: vang, main sheet, jib sheet - quite possibly to a close reach position to make sure you go even faster to further depress the over-vang'd guy beside you. Here you must make sure you do not pinch! And, of course, don't let the boat heel to windward in those lulls. In fact, this is one time I let the boat heel a bit to leeward in order to give myself that illusion of better speed (on the premise that if I feel better, I'll sail better - my crews put up with this quirk).

2.5.3. Helmsmanship

Apart from the obvious requirement of being good at keeping the jib on the edge of a luff with attentive steering, helming brings with it more subtle requisites if you are to join the ranks of the successful "pinchers". Up until not too long ago, I used to think of "pinching" as always sailing that little bit higher, but lately I am more than ever convinced that you cannot "pinch" successfully unless you first get optimum speed for the conditions. You can point higher before hitting optimum speed of course. But that is a sure way to lose due to slower and slower speed through the water which brings with it the added "bonus" of increased leeway. What needs to happen after a loss of speed (e.g. sitting on the start line, after a bad tack or wave, etc.) is that you need to start off in first gear (i.e. with sails not oversheeted and the jib not too close to luffing). Once up to speed, and if the waves are not too bad, you can oversheet the main (but not the jib!), and let the leech tucker disappear for some lengths of time. But, you must be alert for any loss of speed and gear down at its first sign. In the end, like most things, nothing helps like practice.

2.6 The "relief" of the first reach³³

Preparation for the reaching legs is often the last thing on most sailors' minds as they finally get to the windward mark. In windy weather they are often too exhausted to care, whilst in light airs they can be too frustrated at the time it has taken getting up the beat.

Add to these negative feelings the anarchy that reigns in the middle of large fleets, and it becomes almost irrelevant where the gybe mark is. As Billy Bacon once said: "Blow where the next mark is, where is this one?" However, priority number one is still to get round the windward mark without actually hitting it. It is then, and only then, that those sailors who haven't planned ahead, start to get ready for the reach.

For many it is just in that relaxed moment as the boom end clears the mark that disaster so often strikes. The crew dives in from the weather gunwale to do all those things to get the boat ready for the reach. Kicker, cunningham, clew outhaul and centreboard all apparently have to be eased, and what is more, they all have to be done within microseconds of rounding the mark. So what happens? The helm, alarmed at the boat heeling (at this stage the boom may be in the water) tries to bear away and ease the mainsheet. The boat on the other hand, is trying to broach as it builds up an impressive leeward bow wave. All of which results in a slow agonizing wipeout. No - important as all that energetic unloading of tension is, it must take a poor second place to the primary purpose of any reaching leg which is to consolidate your position on the boats that are attacking you, whilst at the same time trying to gain on the boats in front. The name of the game then is "not to lose places". So, rounding the mark in a breeze should mean

³³ Michael McNamara, UKWA News #54/Summer 1992



both sailors staying on the windward side. This actually helps the boat to bear away by creating a slight heel to windward, and creating a weather bow wave. Do not take this effect too far or the results will be spectacular. If there are waves about, then this is the time to catch one. It's one of life's great unsolved mysteries as to why the best waves are always those near the windward mark! Do not look behind, do not worry about the detail, drive the boat down the face of the wave keeping the boat balanced. Your sole purpose in life is to stretch the distance between you and your attackers.

After the wave has finished with you, and the crew can safely move in without heeling the boat, all the usual jobs can be done! Of course this is in an ideal situation which is usually reserved for those who round the windward mark clear of other boats. It is perhaps only those lucky few up with the leaders who have that sort of space. Is it any wonder that they gain! However, for the rest of us, there are some general rules which govern tactics as you bear away around the windward mark.

1. If you are leading a pack then stay fairly high to stop the opposition driving over the top of you. Remember that once one gets your wind, the rest are as good as past.
2. If you are following a gang away from the mark, then go low. Do not get drawn into the luffing match. Aim to gain an overlap for the gybe mark.

Having laid down these general rules, there are of course, other factors to take into account:

a) Be very wary of going too high if the tidal current is setting to windward and/or if the leg is likely to become an even broader reach. The tactic here is - after defending your position - to work down little by little to the rhumb line as soon as possible, taking a transit on the mark from time to time.

b) Do not go low if the tidal current is setting you to leeward or if the wind is forward of the beam, especially if it is too strong for you to handle comfortably.

It is no wonder then that in big fleets, the classic reaching chevron is very soon achieved, as boats try to stay out of the wake of the boat ahead and either go to leeward to try for the overlap or go to windward to try to steal the wind.

As boats get further from the windward mark the more they spread out, and therefore the easier it is to get free wind. So, if you have opted for the windward course, do try to get back down again in nice easy stages bit by bit. If you leave it to the last moment to bear away, then the slower you go and the easier it is for the leeward boats to get water (buoy room).

Clear air is a major concern all the way down the reach. So keep looking at the (inevitable) gang of boats around you and make sure that their pennants are not aiming at you - especially if you are within four boatlengths.

Also try to avoid the confused wash of the boats in front. This is especially important in planing or surfing conditions when it is so vital to get into the rhythm of the waves. The knack, of course, is not to look at the wave you are about to use, but the back of the one that has just left you. With the bow in the trough between the two waves, the sailors will feel the windward quarter start to lift. If possible they should almost anticipate its lift by moving to windward to keep the boat upright. If the boat is allowed to heel, even the merest amount, speed will be lost and the boat will not want to bear away. If the sailors overdo it a bit and the boat heels to windward, that doesn't matter, because it helps the boat bear away down the face of the wave without using that rudder/brake thing at the back.

The track of a boat surfing down the face of the wave will not usually be along its keel line. It will be more crab-like and at an angle. This skidding is best achieved by raising the centreboard rather more than you would think normal. The helm will be able to feel when the board is raised too much, as "helm" comes on and there is also a curved vortex wave on the windward side of the rudder wake. So, drop the board an inch or two and that's just about right.



By the way, if the board is raised too much, you'll have plenty of time to think about it as you swim around the boat to climb back on it! However, the motto is "if the board is in the box, water and its attendant weight and turbulence are not."

As the gybe mark approaches, boats start to converge again, making the problems of getting free air and smooth water even more acute.

We will cover the actual gybe mark tactics next time, but as it gets closer, think ahead. Keep saying to yourself: "Where do I want to be when I round the mark?" The longer the preparation time, the better the chance of getting it right.

2.7 Heavy air gybing tips³⁴

On any windy day throughout the world, you will find Wayfarers capsizing. Sometimes, one can be forgiven for thinking that the gybe mark is equivalent to the Lemmings' drop as boat after boat tumbles into oblivion. It need not be like that, of course. It's up to you. It is perfectly possible to get round the gybe mark even in windy weather.

All you have to do is follow the Golden Rules:

- 1 Don't start to worry before you get to the gybe mark and as you get closer: don't panic.
- 2 Bear away gradually, keeping up speed. Crew sitting in centre and staying there unless ordered otherwise. Board should be about half down for pessimists (something to stand on) or half up for optimists (for optimum speed)!
- 3 Aim to reduce wind pressure on the mainsail by
 - a) gybing at full speed
 - b) at sea, gybe when surfing down wave
 - c) do not slow down. If this happens, delay gybe until accelerating again.
- 4 Tiller extension should be popped over to other side before the gybe.
- 5 After sheeting in a little and as tiller is pulled towards him, helm stands up with feet well apart. (Don't forget to duck as the boom comes across.)
- 6 Grabbing hold of mainsheet and pulling hard as stern goes through eye of wind and then simultaneously, as the mainsheet is eased out³⁵, the tiller is (quite) vigorously jerked back the "wrong" way only for a moment. The effect of this is to push the bow back to leeward and negates the centrifugal force of the boom. Don't worry. The bow won't bury.

³⁴ by Duncan Glen

³⁵ Al Schönborn's note: In our Wayfarer, the helm does nothing with the mainsheet which has the stopper knot tied so that the boom is stopped just short of the new leeward shroud at the end of a gybe to reduce unnecessary stress on the boom where it otherwise slams into the shroud. What does help immensely is that, as the helm begins the gybing turn, the crew grabs the kicker (vang) and keeps enough tension on it to develop a feel for when the pressure on the main is greatly reduced – i.e. the main is ready to come across. At that moment, the crew wings the boom across but does not let go of the kicker. Instead, after the boom has crossed the centre line, the crew gives a healthy tug against the boom's momentum in an effort to stop the boom's swing before it reaches the new leeward shroud. In a blow, this is of course a futile effort, but its effect is astounding. The wild slam of the boom from the end of a gybe not controlled in this way, becomes a gentle swing at the end, and as a result, the helm has a much easier time controlling the boat as he comes out of the gybe. And an added bonus from this method is that it keeps the crew in the centre of the boat as Mike recommends!



- 7 If boat rocks, helm should do most of the steadying by pushing down one foot or the other but keeping the tiller steady. Remember that, as the Albacore is nicely rounded, it's desperate to rock and roll.
- 8 One of the main reasons that Albacores capsize is that coming out of gybe and before the main is pulling, both sailors jump on windward side and the boat capsizes to windward. So get going, sheet in and then sit on the side.

Obviously this all takes much longer to describe than to actually do. So get plenty of practice either on the water or day-dreaming. It doesn't really matter which, except that day-dreaming is drier!

Further Gybing Tips

Following on from your advice on heavy weather gybing in the last edition, I have two additional tips. Each is appropriate to a specific circumstance and, if used at the wrong time, will probably result in some swimming practice.

Tip 1:

Put the board fully down when gybing from run to run. One way of stopping the old 'rock and roll' is to slam the board fully down. The boys at Bala have taken the next logical step and swear by full boards for heavy weather gybes on a run. However, there is one proviso: as soon as the boom comes over, the boat must be borne away dead downwind; otherwise the boat will trip over the board and probably capsize to leeward.

Tip 2:

Let some kicker off when gybing from reach to reach, i.e. at a wing mark. As you approach the mark, ease off some kicker - only time will tell how much. Pick the moment when you are going flat out and are in control. Then perform that perfect smooth gybe. The eased kicker does two things:

- a it raises the boom end, keeping it out of the water, and
- b it allows the main to depower on the new gybe, thereby reducing the chances of being knocked over.

Again a word of warning: go boldly! With the kicker eased, there is a potential for the windward death roll if the boat is pointed dead downwind for any length of time.

My own advice is to practice, practice, practice.

2.8 Flying the spinnaker

2.8.1 Basic techniques

The important things to remember here are:

- to get the sail as flat as possible which keeps the angle of attack shallow as well as opening the leech to leeward to stop the mainsail backwinding
- to keep friction down to a minimum in the control lines set-up

To get the spinnaker as flat as possible, it is necessary to organize the sheeting and pole position. The spinnaker needs to be hoisted as high as possible. Do not tie a knot in the halliard just above the head to keep the head away from the mast. A knot could also jam in the halliard exit sheave. Incidentally, the pole should always be clipped on to the mast eye with the piston part uppermost. This means that the crew doesn't have to lift the pole up and over when setting, or up and out when lowering. It also means that the spinnaker sheet is running over the solid part at the outer end, and not the piston. The spinnaker pole uphaul has to control the height of the pole and needs to be adjustable.



Oversheeting is in fact a major problem when flying a spinnaker. Fearful of wrathful comments from their helmsman, many crews will oversheet the spi, simply to stop it from collapsing. What they should be doing in fact, is just keeping the leading edge from collapsing, just so that it is on the verge of curling back at approximately half height. In other words, the object is not to pull the sheets, but rather the reverse, to keep easing and easing. The crew should be trying to get the clews as far away from the boat as possible. Don't worry about getting the two clews at the same height, except perhaps on a run (when it comes almost automatically). So, if the spinnaker doesn't collapse on a reach at least once, then it has been oversheeted and is being kept too close to the other sails. Since the helmsman is constantly altering course to make the most of wind and waves, the crew will have to play the spinnaker all the time. The helm may be able to help with an occasional pull on the windward side.

2.8.2 Spinnaker handling

1. hoisting to leeward

Always plan to hoist to leeward. It is safer and simpler. Before a race check the course and rig the spinnaker so that it will be to leeward for the first reach:

- Free the halyard and the sheets;
- Cleat the uphaul for the approximate pole height desired as per threads in control line;
- Pre-cleat the guy in the approx. position per coloured threads in the sheet and guy
- Adjust the main, jib and centerboard for the new course to keep up boat speed before hoisting;

Helm hoists the spinnaker. (If it is heavy air ease the main and raise the CB most of the way before hoisting so as to keep the boat under control until helm and crew can hike). Crew fits the guy to the pole, fixes the uphaul/downhaul to the middle of the pole, and then hooks the pole to the mast. While the crew is doing this, the helm hikes the boat flat. Keep the pole end hooks pointing up to help prevent the guy from falling out. Crew then takes control of the sheet and guy, and hikes to keep the boat flat. It is critical to keep the boat flat on spinnaker reaches & runs. The boat will quickly broach and capsize once it starts to lean in strong winds. If necessary, release the sheet to get the boat flat. If the helm can not bear off quickly enough in the gust, it often pays to heel slightly to windward until the rudder is perfectly balanced. It is exciting to plane with the spinnaker flying in strong winds. The secret to survival is to keep the boat flat:

- raise the CB to be only about 1/3 down;
- both helm and crew hike well out;
- do not overtrim the sails; partly luff the main if needed;
- bear off quickly in gusts, head up in lulls;
- if starting to lean in a gust, release the spin sheet momentarily until the boat recovers;
- on runs, avoid "death-rolls" by putting the CB most of the way down, and slightly;
- oversheeting the main and spinnaker.

2 hoisting to windward

- Bear away to a broad reach then set main, jib and CB;
- Cleat the guy to the "preset" mark;
- Crew frees the halyard and sheet, takes the sheet in one hand then gathers the sail up in a ball and throws it to windward of the forestay as the helm quickly hoists;
- Immediately after throwing out the sail, the crew quickly trims the sheet so as to pull the sail around behind the jib. (If the spinnaker blows between the jib and the mast, it will be big trouble!);



- Helm takes the spin sheet, keeping it trim, heads up to the proper course, and readjusts the main;
- Crew installs the pole then readjusts the sheet and guy;
- Retrim the jib, adjust the CB and go!

3. gybing the spinnaker

note: The priority when racing is to make a crisp smooth rounding and quickly position the boat on the best tactical course (usually to go high to prevent others from taking the wind). Hence get on the new course, set the main and jib, then fix the spinnaker later.³⁶

- Approach the mark wide to windward. Try to time the gybe to avoid gusts and, in major wind and waves, to coincide with a surf;
- Crew eases out the sheet (soon to be the guy) and pre-cleats it to the mark which will have the pole just off the forestay after the gybe;
- Helm eases the main all the way out while bearing away to a dead run. Crew trims the old guy in until the pole is parallel to the thwart, removes the guy from the guy hook & pre-cleats it to the mark set for the new sheet. (Do not pre-cleat this line in strong winds!);
- Crew sits on the center of the thwart for the gybe, releases the jib sheet and raises the CB most of the way up (only if heavy air);
- Helm bears off for the gybe. Crew can help bring the main over using vang. Helm grabs the parts of the main sheet (between the traveler block and the boom) so that they do not catch on the transom corner;
- Helm trims the main for the new course. Crew recleats the jib, helps helm to balance the boat and fits the new guy under the guyhook on the side deck;

When the boat is under control on the new course, the crew stands up, unhooks the pole from the mast, trips the old guy from the pole, fastens new guy in the pole hook, checks that the uphaul/downhaul is secure, pushes the new guy end of the pole up to the new spinnaker tack and connects the other end of the pole to the mast. While the crew is changing the pole, the helm hikes the boat flat and steers for tactical advantage. Crew hikes to windward, trims the spinnaker sheet, adjusts the guy, then retrims the jib. The CB can then be reset to approx. 1/2 down if it has been raised for safety in the gybe.

4 Dousing the Spinnaker

Always bring the spinnaker down to windward.

Arrange the windward jib sheet so that it is aft of the crew's legs. This insures that the spinnaker will be stowed to leeward of the jib sheet ready for the next hoist:

- Crew hands sheet to the helm, stands up, and unhooks the pole from the mast;
- Crew pulls the pole aft, releases the uphaul/downhaul and slides the pole into the supports along the boom, then releases the guy;
- Helm releases the sheet, crew pulls in the guy, gathers in the foot of the sail and tells the helm to release the halyard;
- Crew drops the sail into a storage bag (or just under the deck) being sure to get all the sail off the deck, while the helm lowers the CB then begins to sheet in the main.

Approach the leeward mark wide so that the boat can be hard on the wind as it passes just to leeward of the mark. Crew gradually trims the jib and begins to hike, as the boat heads up for

³⁶ Al Schönborn's note: The system that follows was based on the tapes which were made before fell in love with the "balls" system which in my opinion is the best spinnaker system available to us! With the "balls", all that guy hook and pre-cleat stuff is basically not necessary.



the beat. Once the boat is trimmed for the beat, crew secures the halyard under the guy hook, organizes the old guy and cleats it to keep it out of the water. The old sheet is organized, put under the guy hook and cleated when on the next tack. Remember to readjust the outhaul, vang and cunningham if they had been reset for the reach or run.

2.8.3 Using the "balls" system

This initially complicated but ultimately very handy spinnaker sheeting system was first noted on some of the UK boats in the '89 Worlds at Vallensbæk in Denmark where its heavy air potential could be easily appreciated. A year later, it was outlined in the Danish "W-Nyt" by Poul Ammentorp (W239), and I shall try to summarize and update the use of this system here. The "balls" system requires a barberhauler (henceforth referred to as BH) arrangement for the spi sheet plus a pair of plastic balls threaded onto the spi sheet which are kept in the forward ten feet or so of each sheet end by means of a suitable blockage such as a whipping. For set-up details see 2.1.8.

Our routine assumes a typical buoys-to-port, triangle-sausage-windward course:

(a) before the start

- 1 carefully pack spi in port-side bag, ready to hoist without twists
- 2 cleat port spi sheet at its marked spi-reach position
- 3 stow pole on starboard side of boom

(b) near windward mark

at end of last port tack:

- 1 unhook spi halyard from storage hook on port side
- 2 make sure port BH is uncleated
- 3 feed one metre of starboard spi clew out of spi bag and onto foredeck while tightening and cleating the starboard BH from the port side of the boat

at end of last starboard tack:

- 1 pole downhaul out of storage hook at forward end of boom (see 1.5.3. Spinnaker pole control);
- 2 if practical, helm presets pole to correct sailing height;
- 3 adjust controls for upcoming reach (e.g. outhaul, cunningham, vang).

(c) after rounding:

- 1 check that it is tactically desirable to hoist - i.e. make sure that you will not be luffed or passed to windward during your hoist;
- 2 when conditions are "go", crew takes main and jib sheets and balances the boat while helm hoists spi. This is especially important when the boat is (or may be) overpowered. On "Shades", the crew regularly has to briefly strap the jib in after the hoist in order to free the spi sheet which catches under the jib foot. After this, the crew cleats the jib in an effective reaching position;
- 3 once the halyard is carefully cleated, the helm takes over the mainsheet and balancing duties while the crew sets the pole;
- 4 once the pole is set, the spi should fill since its sheet was pre-cleated. Crew then takes over the sheet and fine-tunes the spi.



(d) at the gybe mark

the approach:

as helm begins to bear away for gybe, crew yanks pole well aft to bring (most of) spi to starboard side while releasing leeward spi sheet, cleats in port BH, and uncleats jib - helm waits til crew is done before completing the gybe.

the gybe:

- 1 both helm and crew concentrate all energies on the gybe - the spi, with both BHs cleated in should present no problem unless the gybe is badly mishandled!
- 2 in windy weather, the crew helps the boom over by grabbing the vang. Crew exerts some pull on vang without actually trying to force the boom over until it indicates it wants to go when the pressure on the sail decreases significantly.

If a capsize is feared, the helm must do an S-gybe (i.e. pull the tiller briefly to port as the boom goes over) and the crew should help by trying to stop the boom from crashing over by resisting its momentum (i.e. fighting boom's momentum by pulling on the vang once it has crossed the centre line). This cushions the gybe and makes the boat easier to steer out of the gybe.

after the gybe:

- 1 helm & crew balance the boat and steer as tactics dictate (e.g. go high to defend wind) while trimming main and jib to best effect;
- 2 at word from helm, crew completes pole transfer while helm drives and balances the boat;
- 3 crew uncleats leeward BH and sheets in

(e) end of second reach

approaching the leeward mark:

- 1 helm and crew set sail controls and board for upcoming beat;
- 2 at word from helm, crew stands in front of windward jib sheet and stows the pole. Helm may adjust uphaul for storage parallel to boom, or do it later, as the situation dictates;
- 3 helm stands (briefly, if necessary!) to uncleat spi halyard and holds it in a light grip over his head to anticipate (and prevent) tangles. In a blow, the halyard can be thrown overboard to achieve the same effect;
- 4 crew quickly pulls spi down while helm exerts enough halyard pressure to prevent the sail from coming down faster than the crew can handle. If this is done quickly enough, there should be no risk of the leeward spi sheet going under the boat (which is slow!).

(To further help us to keep from sailing over the sheet, we also have a little 10 cm (4") stainless steel wire loop sticking out from the bow at deck level.). Crew pulls all slack from spi halyard and stows it around the storage hook near the shrouds before cleating halyard in small black clam cleat near mast. If time permits, crew stuffs spi into bag.

at the mark:
Having the board full down, playing the jib and keeping the boat flat as we round onto the beat are the priorities - something which has to be stressed with crews who have a fetish for neatness. Cleaning up can be done later, when you're settled away on a tack that you expect to hold for a while.

(f) end of second beat and start of run:

- 1 since the next leg will be a run, both BHs may want to be cleated in, but the windward one for sure!
- 2 here the procedure differs in that helm and crew can both work on the spi at the same time: helm hoists and then takes both sheets to fly the spi while the crew adds the pole to the mix. If you have remained on starboard tack, this will be difficult because the



pole is wedged against the shroud on the leeward side of the boom, and will require the helm to sheet in a bit! The crew wants to add the pole carefully so that the spi, being so masterfully flown by the helm, will not be made to collapse!

- 3 once the pole is attached, the helm can cleat the windward sheet in an appropriate position while the crew takes over the sheet
- 4 coordinating their motions, helm sits/stands to leeward, crew to windward
- 5 in light airs, helm holds boom out and gives boat a windward heel to help the spi set better

(g) run-to-run gybe:

In true survival conditions, I would cleat both BHs, and have helm and crew both concentrate on the S-gybe with the crew on the vang with priority #1 being capsize avoidance.

In all other cases:

- 1 the helm stands and steers with his knees while he grabs the leeward sheet and waits for the crew to pass him the windward one. Both sheets are held in the part that comes directly from the spi !
- 2 helm steers through gybe with his knees (S-gybes require some practice here!) and tries to keep the spi flying while avoiding the boom (again: practice makes perfect!)
- 3 crew cleats jib on new tack, switches pole as quickly as possible because the boat is
 - a stern-heavy while helm steers with knees
 - b under less than optimum control
- 4 helm now cleats windward sheet from where he's standing, grabs the tiller and moves forward to his usual position to get the transom back out of the water. Meanwhile, the crew takes over the sheet.

(h) the end of the run:

The take-down can (usually) be quite relaxed since it is often possible for the crew to stow the pole quite early while the helm plays the sheets until the last dog is hung! Thereafter, the take-down procedure is the same as before!

2.8.4 The spinnaker gybe

As a heavy-air gybe approaches, both helm and crew will usually start to worry about whether they will survive. Their best chance of doing so, will depend upon how adept they are at doing the various jobs and how well they have them organized.

Gybing from one reach to another

It is essential to have a routine that is practised beforehand and is always adhered to. Think for a moment about what is involved: we want to alter the boat's course, to get all three sails from one side to the other and we want to change sides ourselves. All this without having to swim. If each job is given a number, then a proper sequence emerges:

- 1 Approach the mark well to windward. Give it a wide berth.
- 2 Look for suitable waves to gybe on, at the same time as looking for gusts. Do not attempt to gybe while decelerating in a wave or as the wind increases. Both slow the boat down relative to the wind and increase pressure on the sails. Arrange to gybe while accelerating or when the wind pressure on the sails is dropping.
- 3 As you approach the gybe point, the crew stands. He eases the leeward sheet and cleats it at the 'reach' mark for the other side. As he does so, the boat is borne away on to a dead run and the helm stands.
- 4 At this point the crew pulls the spinnaker around by pulling on the old windward sheet.



- 5 The main boom is sheeted in a bit, and, on order, the gybe is started, and the boom is flicked across by the helm (helped by the crew perhaps)³⁷.
- 6 As the crew goes over with the helm, he uncleats the jib, and takes the sheet from the other side with him.
- 7 Crew balances the boat, forgetting the sails until the boat is stable again.
- 8 Crew cleats the jib. On the order "NOW", from the helm, he goes forward to unclip the pole from the mast.
- 9 The leeward sheet is pulled out of the plunger.
- 10 The uphaul rope is reorganised in its pole fitting if necessary.
- 11 The new windward sheet is fed through the pole end and that end is pushed forwards.
- 12 If the crew has cleated it right, before the gybe, the new windward sheet will stop the pole just short of the forestay, while the new leeward sheet, if pre-cleated correctly, should just enable the sail to set.
- 13 All this time, the helmsman should be refraining from such unhelpful comments as "Hurry up!", etc. He should be standing, balancing the boat for the straining, un-balanced crew. He should be keeping the boat as upright as possible, without swaying to windward, which will un-balance the crew even further.
- 14 Be careful about feeding the windward sheet through the lead near the shroud, or about tensioning the windward barberhauler. This will bring the pole aft by tightening the windward sheet, and may cause the spinnaker to collapse.
- 15 The crew sits down, sheeting the jib in properly - easing or tensioning as necessary. Then he picks up the leeward spinnaker sheet.
- 16 The helmsman sheets in and off they go.

Gybing on the run

Gybing on the run uses very similar techniques except that the crew should hand the sheets to the helm after gybing the main. The helm can then keep the spinnaker flying whilst steering with the tiller between his legs.

2.9 Racing techniques

In recent years, the Wayfarer has developed into an exciting and demanding racing dinghy. Exciting, not in the sense of an out and out planing trapeze dinghy, but rather in the sense that it responds so beautifully to correct, accurate control. In fact the closer the racing, the greater the need for this positive control. Thus, proper technique is important. Luckily, the controls which organize Wayfarer boat speed are now well known. Influenced as they are by the specific characteristics of the Wayfarer, these controls revolve around:

- 1 The need to keep the relatively heavy hull with its large wetted area moving as quickly as possible in all conditions.
- 2 The need to keep the air flowing smoothly over the large, low aspect ratio sail plan without the air stalling and without the boat heeling too much.
- 3 To ensure that the raked aft centreboard creates the maximum possible resistance and that the rather small rudder blade steers the boat, even in the strongest of breezes. With their parallel sides and short bevels, they will both stall all too easily if not properly used.

³⁷ Al Schönborn's note: I don't think anyone I know really "flicks the boom across" except in light air. It is usually necessary to bear away well past straight downwind until the boom 'wants' to come over. See also the article on the S-gybe in Efficient Sailing!



- 4 That the long toe straps are as comfortable as possible so that the sailors can work efficiently.

Obviously there are many subdivisions within these major groupings, but the Wayfarer sailor, at least initially, should be concerned with general areas of responsibility rather than become obsessed with detail.

1. Heeling

Keeping the boat upright is perhaps the single most important aspect of Wayfarer boat speed. If the boat is allowed to heel, the water has to travel around asymmetrical curves; the waterline is shortened and the stern digs in. Not only does the boat go slowly, but it is also hard to steer with massive weather helm, and then the boat goes sideways as the centreboard loses its grip. The motto has to be: Keep the burgee above the crew's head. This is obviously achieved by easing out the mainsheet to reduce the amount of curvature in the main as soon as the boat heels. In extreme circumstances, the genoa should go out, too.

The proper technique is to watch the gust coming towards the boat, decide whether it is going to head or lift, and then, as it hits, have the sheet ready to ease, i.e. uncleat the sheet. As soon as the boat heels, ease and keep easing, even if the main is backing. Once the gust has eased, the main can be sheeted in again. The way to decide whether the approaching gust is a header or a lift is straightforward. If the gust front looks closer to the bow than it does to the side, then the gust will be a header. If the front appears to be closer to the side than to the bow, then it will be a lift. In fact, it doesn't matter what happens as the gust hits, as long as the sailors are prepared for its arrival. This system works best if both helm and crew remain fairly still and sitting out. If either of the sailors keeps diving inboard too early, then the boat is unstable, and the sails cannot be sheeted correctly. There is no need to keep moving about anyway, because if the boat heels to windward, then all that is needed is to sheet the main in to lift the sailors up out of the water. The only exception to the upright rule is in very light winds. Here the boat needs to be heeled just enough to get the sails to set rather than flop about.

2. Fore and aft trim

A common fault often seen in Wayfarers is that the sailors sit too far forward when beating. This sinks the bow and lifts the stern out of the water - reducing the water line length. In simple terms, the helm stays behind the thwart in all conditions except in very light airs. The crew should be close to the leeward shroud in very light winds, move aft to sit on the centreboard box as the wind gets up a bit, and 15 à 20 cm (6-8") behind the shroud while hiking out. In very windy conditions at sea (with big waves), move even further aft to keep the bow up. Off the wind, move aft only in planing conditions, and then just enough to keep the bow up. In very windy conditions on a broad reach, both sailors can sit well aft to get the flatter sections at the stern to work. Watch out though, for sinking the transom too much. A turbulent wash and back eddying wake are the signs to watch for.

3 Use of the rudder

The rudder blade is fairly small, and, as it is parallel sided, the flow breaks away fairly easily. So, overzealous use of the rudder (i.e. increasing its angle beyond 45°) will reduce its ability to steer. This is particularly important when tacking or gybing. The front of the rudder blade should be vertical. It should also be held down solidly by a pin (6mm (¼") wood dowel is legal) and/or a very strong downhaul shock cord. The tiller extension should be about 96-97 cm (38") long and may benefit from bumps of PVC tape, etc. to provide a better grip. Wherever possible, help the rudder by using the sails. If you want to bear away, ease the mainsheet (to bring the



centre of effort forward). If you need to luff up, ease the jib very slightly (to bring the centre of effort aft).

4 The centreboard

It is vital that the centreboard have minimum play inside the box. On glass boats with wide slots, you need to insert plastic or tufnol washers of several inches' diameter on both sides of the board, putting the centreboard pin through them. The leading edge should be as close as possible to the maximum 83° angle allowed to get the biggest possible presented area.

When sailing off the wind, have as little board down as you can without skidding sideways. If there is too little board down, the helm will feel heavy and the wash will be turbulent on the windward side. So if in doubt, look aft!

The leading edge needs to be nicely rounded. An arc of about 1 cm (3/8 ") inch is about right. It should merge gently into the centre flat sections. The transition between the flat centre and the aft bevel should be equally smooth with no abrupt change in profile. The very back edge needs to have 3 mm (1/8") flat or so, to give it strength.

5 Hiking straps

The toe straps should be just long enough to enable the sailors to sit out comfortably. There should also be shock cord tensioning to keep them taut so that the sailor can find them easily after a tack or gybe. There must also be enough room left between the helm's toe straps to enable him to step between them as he tacks.

6 Tacking.

The Wayfarer will roll tack beautifully without stopping. The secret of a good tack is for both sailors to remain on the old windward side until the boom has gone over. Then both sailors should move to the new windward side. It is also important to ease the mainsheet a little as the helm goes across. This lets the sailors sit down without the boat heeling too much. The crew should be marginally behind the helm so that he can, in windy conditions, sit down on the weather side, or in light conditions, move back to the leeward side as needed. Especially in light winds, the helm is usually unbalanced at this time, and must be careful how he sits down. If he is too clumsy, the air will be shaken off the sails.

For this reason, aft mainsheeting is generally better for sailing inland in light weather because the helm faces aft during the tack and is crouched lower in the boat. The helm should always swap hands on the tiller before he leaves the old windward side. Then the extension is already in the correct hand when he gets onto the new tack.

Centre mainsheet roll tacking is rather more complicated as the helm has to face forward. He shouldn't swap hands until he has sat down on the new windward side, even though this means steering with his hand behind his back for a second or two³⁸.

7 Gybing.

The Wayfarer is incredibly stable and can be gybed even in the very strongest breezes. The gybing technique obviously varies according to wind strength and whether or not the spinnaker is being used. In light winds the boat will roll gybe using techniques basically similar to those used in roll tacking, in that the helm and crew wait until the boom goes across before moving across the boat. This has the particular advantage of heeling the boat slightly on the new gybe to keep the mainsail quiet. The gentler the sailors' movements in these conditions, the better. The crew

³⁸ Al Schönborn's note: We have available to borrow, a video of Mike demonstrating roll tacking and gybing as well as using sail trim to help steer. My editing is amateur but Mike's demo is professional!



should hold the boom out after the gybe to prevent it coming back into the centre. The vang too, should be well eased, but not so much that the boom jumps off the gooseneck.

In windier conditions, the helm should be in control. As the helm bears away, the crew should move to the centre of the boat, and then stay there until the helm is ready for him to move. This means that the helm knows exactly where the crew is, and can then get him to move to whatever side is needed. It pays the helm to sheet in a fraction as he bears away. Then he can ease the sheet as the boom goes out on the new side. This acts as a spring on the mainsail which otherwise fills quite violently³⁹. The moment the boom goes across, the helm should urgently tug the tiller so that the bow is pushed in the same direction as the boom for an instant. Then he should almost immediately straighten the helm. This stops the violent spin towards the wind which so often causes the broach and/or capsize. For this reason, it is best not to throw the boat around too quickly when gybing from reach to reach in a breeze. Arrive at the gybe mark slightly high, bear away onto a dead run, gybe, and then harden up after the spinnaker is sorted out.

8 Stopping and accelerating fro a standstill

This is a very important technique as it is absolutely essential to getting good starts. It is best practised outside the race situation by seeing how long the boat can be made to hover close to a buoy. It will be surprising how long it takes to stop. When accelerating away, the correct technique is to sheet both sails in together in a smooth, non-jerking way⁴⁰. This will keep the boat tracking without it luffing up and stopping. The rudder must not be used until the boat is moving, otherwise it acts as a brake.

9 Rounding marks

The number one rule is to get round the mark without hitting it. So, when rounding on its windward side in windy conditions, leave a good boom's length to spare. In rough conditions with big waves, the mark will be moving about quite a lot, so keep well away. When approaching any mark, check which way the tide or current, if any, is flowing. The buoy could be leaning away from the current and there might be a wake. The general rule of thumb is to approach the mark wide and leave it close. This stops others from barging in. Try to keep mark rounding simple by not tacking too close either before or after the mark. In other words, sailors should try to settle down, both in approaching and in leaving the mark. As they are approaching a mark, both sailors should know where the next mark is, and what sort of a leg it will be getting there, i.e. how the sails, etc. are likely to be controlled. When rounding the windward mark, many sailors are so obsessed with getting the spinnaker up and getting the other sails organized for the offwind leg, that they miss out on waves. Surfing on waves is the biggest and easiest way of dramatically increasing speed. If one or more boats are close behind as you round the windward mark onto a close spinnaker reach, then stay high⁴¹. If you follow a gang of boats round the mark, go low - thinking of the inside position at the next mark.

³⁹ Al Schönborn's note: Another outstanding way to cut down on the violence of a windy day gybe is to have the crew use the vang (kicker) to start the boom across and then restrain the boom from really slamming across by pulling against the direction it wants to go once it has crossed the centre line of the boat. This really works supremely well!

⁴⁰ Al Schönborn's note: if you've been luffing above close-hauled, as is usually the case when you're sitting on the line, it is best to sheet the jib in first to encourage the boat to bear away to a close-hauled course.

⁴¹ Al Schönborn's note: Don't let them go over you while you hoist your spi in light or medium breezes. In those conditions, a brief lack of spinnaker costs virtually nothing as you sail high to



10. Reaching

The tactics used will depend upon the proximity of other boats, and what the wind and tide are doing. If you are alone, it is obviously best to sail in a straight line to the next mark except to play waves or gusts (bearing away in gusts and down the face of waves while luffing up in the lulls and in the troughs). If the tide is going to get stronger or weaker along the leg, then allowance must be made by heading either up or down from the mark. Also, if the wind is going to head, then sail high, but if it likely to free, then sail low of the mark early. It can often pay to go low to the next mark when following a group of boats, because the natural inclination of sailors in front is, quite rightly, to defend their wind and luff up to stop others from overtaking them to windward.

If you are leading a group, it is therefore essential that those close behind do not get high enough to blanket your sails. But beware of going too high for too long so that the final approach to the next mark is on a broader, slower course. The exception to this is in a breeze, because all the necessary jobs involved in taking down the spinnaker can then be done without the boat heeling over. Playing waves is very straightforward. Wait until the stem lifts and the bow is just behind the wave in front, and then bear away just enough to accelerate. The secret is to watch the wave in front, and to try to keep the bow just behind it. Obviously, one cannot keep bearing away, so track a little to windward at every opportunity. The fastest course to the mark in planing conditions is therefore a series of gently curving zig-zags. Keeping the boat upright is absolutely vital. In fact, when bearing away, heeling the boat to windward helps to keep the boat tracking.

11 Running

Getting down the run is a compromise between sailing the shortest distance on a dead run and luffing up slightly to build up extra speed. The general rule is that it pays to luff up to keep moving in very light winds, or to get the boat planing in marginal planing conditions. As soon as the boat planes, it pays to start bearing away again. The problem is, of course, that luffing up increases distance sailed and so the extra speed has to at least compensate for the extra distance. As a general rule therefore, tacking downwind does not pay. Because of its heavy weight, the Wayfarer does not plane sufficiently to make up for the extra distance sailed.

If, sailing marks to port, you approached the windward mark on a starboard tack lift (or marks to starboard on a port tack lift), it will pay to gybe straightaway after rounding. If you approached the mark on a header instead, it will pay to leave the mark without gybing. Everything else being equal, consider on which side the spinnaker is stowed, as you decide on which gybe to choose. On a run, it is often easier to hoist the spinnaker on the windward side. Hoisting to leeward means that the spinnaker has to be pulled around the vang, jib sheets, etc. When approaching a leeward mark, think about what side the spinnaker will be used on next. Try to get it stowed so that you will have a leeward hoist for an upcoming reach. Since the spinnaker should always be lowered to windward, you may need to do an extra gybe to achieve the desired effect.

12 Beating

If in doubt, take the tack that will take the boat closest to the windward mark. Check tidal/current flow, and always try to get a lee bow if there is the merest chance. Keep a

discourage others from passing to windward. On the other hand, it is very hard to get past even a boat not flying spinnaker on a close reach once they have passed you except in a blow.



constant watch to windward, watching out for signs of likely changes in either wind strength or direction - smoke, other boats, etc.

In light winds, keep the boat moving and do not keep tacking and tacking. In a breeze, watch the approaching waves. Whatever happens, they must not stop the boat. So, if necessary, ease the sheets, bear away and accelerate. Just as the wave is about to hit, luff slightly to reduce frontal area, and then, once the wave has passed, bear away again to regain speed.

Be very wary of getting too far out on one wing or the other of the beat. This is even more important as you approach the mark.

13 720 Turns

Very few Wayfarer sailors practise 720° turns and yet they should. I imagine how tense the situation is! An incident has occurred. The sailor has admitted responsibility and must begin his turns as soon as he is clear of other boats. He's het up. Which way does he go? Luff up to tack or bear away to gybe? It invariably seems to pay to gybe first. Luffing up is far too slow, especially if the centreboard is not down!

2.10 Basic boat handling tips

- Keep the boat flat. (In very light air, a slight leeward lean will help to keep sail shape and reduce wetted surface area.);
- Trim all sails so that they luff evenly from top to bottom;
- Do not oversheet the sails;
- Normally keep crew weight together at the center of the side deck;
- Crew weight forward in light air.
- Crew weight aft when planing in strong winds to keep the bow up.
- It rarely pays to tack downwind on runs in a Wayfarer;
- Use crew weight to help turn the boat. Hike to windward to bear off for a gybe. Move to leeward to head up;
- Adjust crew position, sail trim and centerboard to get a balanced rudder on all points of sail. (Think of the rudder as a big brake!);
- Try to maintain a positive relationship with your helmsperson or crew!

Priorities for racing success

- 1** an enthusiastic and positive crew/helm relationship
- 2** on-the-water experience
- 3** sail trim and boat handling
- 4** preparing the mast, hull, rigging and foils
- 5** knowledge of rules and tactics



2.11 Safe sailing

This paragraph has twice appeared as an article in the *Whiffle*, but I feel that it is worth posting since it can remind all of us about a few essentials! Until Tim France and Don Davis invited me to speak at a Guelph Seminar, I had always considered that I was mostly coaching the few that race. For my talk with day sailors and cruisers, I re-discovered some basics and a few little tricks that I have picked up over my forty plus years of sailing and racing. In my experience, these are every bit as useful to those who simply sail, as they are vital to the racers.

This paragraph will deal with these main topics:

- the why and how of setting your sails properly (setting the sails);
- the why and how of correct sail and boat trim (correct trim)
- a few special tricks (miscellaneous manouvres)

2.11.1 Setting the sails

There are three main benefits of doing a proper job of setting your sails:

- 1 You get better performance
- 2 longer life from your sails
- 3 best of all, you look as though you know what you're doing!

The genoa/jib:

We hoist this first. It is smaller and easier to deal with while the main is still down. It is essential to good upwind performance to have the jib halyard up tight enough so that the leeward shroud does not hang loose when you sail close-hauled. If there is too little jib halyard tension, the jib luff develops a hook that makes it impossible to point well.

Most racing Wayfarers use a tensioning device such as a "Magic Box" or a Highfield lever and a halyard that is stainless steel wire (3mm) between the head of the sail and the place where it hooks onto the tensioning device. N.B. Beware of over-tensioning the jib halyard as this may flatten your jib luff entry in a way that narrows your "groove" to the point where performance suffers drastically as well. The rule of thumb is: Tension the halyard until the leeward shroud is just on the edge of losing its slack while you are sailing close-hauled. If you find that your jib luff tickers are too jumpy, i.e. they indicate you are luffing and stalled (too far off the wind) at virtually the same time, your jib luff entry is too flat and you must reduce jib halyard tension until the problem with the tickers is resolved (in very bouncy conditions this may mean a slack lee shroud!) Without the aid of a mechanical advantage, it is difficult to get adequate tension, but you can get closer by having someone hang over the bow off the forestay (to pull the mast forward) while the other crew member hoists and cleats as tightly as possible. But be a bit cautious on this - I bent a CL16 mast once, using that method. Other needs for the jib are good cleats and soft braid jib sheets that will cleat well and be kind to your hands.

The mainsail

Unless you have a main that is much smaller than the rules allow, you should hoist your main virtually to the top of your mast (to the "black band" if you race!) This sounds simple but can easily become impossible, unless you remove any forces that may cause the main to get stuck as you hoist. On W3854, we always do the following as we hoist the main:

- 1 hold the boat head to wind with the centreboard fully raised to allow the boat to stay head to wind easily;
- 2 take the boom off the goose-neck which on "Shades" is fixed at black band level;
- 3 make sure that both boom vang (kicker) and mainsheet are quite slack;



- 4 hoist as high as the sail will go (or is allowed to go) and hook or cleat the halyard;
- 5 pull the boom down and re-insert into goose-neck (but if this stretches the luff of the mainsail because your sail is under max. size, it is better to hoist a bit less and lose the stretch which causes a big bag in the main just aft of the mast when winds are light to medium);
- 6 vang on as required.

Other needs are:

- battens that fit well
- a powerful boom vang to bend the mast and de-power your main upwind and to reduce twist in your main off the wind in a blow. Reducing twist on a windy run is especially important since and overly twisted main makes gybing difficult and can cause the top of the mast to be pushed to windward which is a source of the infamous "death roll" capsize.
- a good mainsheet swivel cleat set up so that it is difficult to accidentally cleat the main
- a mainsheet that is thin enough to run freely through its various blocks (6 mm (1/4") is ample and much cheaper!)
- a cunningham to tension the luff of the main (and one for the jib, depending on your sailmaker), pulling its draft forward on old sails, and on sails that have been flattened via mast bend (draft forward shape is more forgiving!)
- a reefing system (unless you race) that does not require removal of your vang (kicker)

2.11.2 Correct trim

There are two kinds of "trim": boat trim and sail trim. Both are relatively easy to achieve and maintain, and both are crucial to performance. Good boat trim is also a key to sailing safely.

Boat Trim

The basic rule of thumb is to keep the boat level - both fore and aft, and sideways. This allows the boat to perform as intended.

Fore and aft: Neither the bow nor the transom should dig into the water. Distribute your weight accordingly. On racing boats, the helm and crew usually sit next to each other on either side of the centre thwart. This means a good 90 à 100 cm-long extension tiller is very helpful as it permits the helm to sit forward and/or out. N.B. On a windy reach or run when the boat wants to plane, sit well aft (even on the back tank!). Keeping the bow up, allows the boat to sail on its flatter aft sections, which is much more stable, i.e. not as capsize-prone!

Sideways: The basic rule of thumb is to sail the boat flat - except in very light airs where some heel to leeward may help to keep the sails from flopping around.

How much heel is too much? - If your tiller gives more than a slight pull to leeward, you are heeling too much!

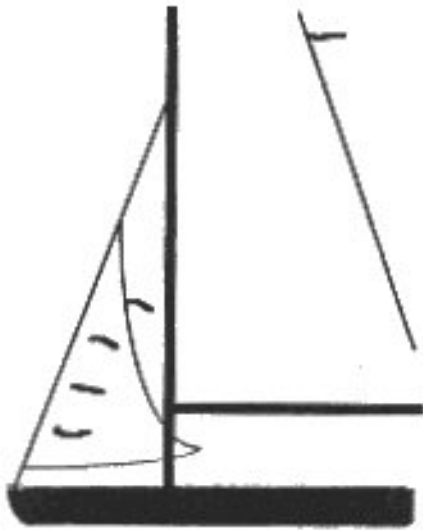
Why is too much weather helm bad? - You are using the rudder as a brake while slowly weakening it for the day it will finally give in to years of unnecessary strain. The helmsperson also wastes energy, wrestling with the tiller while trying to keep the boat on course.

How to correct weather helm caused by too much heel? - Hike out and/or flatten your mainsail with lots of vang. If this is not enough, "rag" the main (or reef) as much as is necessary to make the excess heel and weather helm go away.

Sail Trim

All sails perform best when trimmed to the edge of a luff. This means steering to the edge of a luff when close-hauled, and letting the sails out til they start to luff, off the wind.

If in doubt, let it out!! A sail that is luffing loses power roughly in proportion to how much of its area is luffing. but, a sail that is in too tight stalls entirely. The boat won't crash like a plane but the power loss is nearly total in short order!



Essential to judging good sail trim are 10 to 15 cm lengths of virgin wool called various names - "tickers" on our boat. These indicate the quality of the air flow over your sails.

On "Shades", we have three sets on each side of the jib luff (1/4, 1/2 and 3/4 height), plus one each about 3/4 up the leech of the main and jib (*see diagram*)

The wool should be threaded through the sail with a needle. This way, you need only one 20-30 cm. length of wool for each jib luff pair of tickers which is fixed in position by means of an overhand knot (half a reef knot) close to each side of the sail.

Leech tickers are also threaded with a needle out the back of the leech after a figure 8 stopper knot has been put into the end of the 15 cm. length of wool that will end up between the folded layers of cloth at the trailing edge of the leech.

N.B. Be careful to position tickers so that they are in the least possible danger of catching on seams or curling around the front of the jib luff!

How to read the luff tickers? When a windward ticker starts to flicker upwards the sail is starting to luff. This sail trim is just about perfect. If the upper ticker lifts before the lower while you sail close-hauled, the top of your jib is twisted off too much and you can sheet in some more. The reverse also applies, i.e. ease sheet to avoid lower ticker lifting first.

How to read the leech tickers?

Upwind, sheet in until the ticker starts getting sucked behind its sail.

Off the wind (main only), tighten vang until ticker starts getting sucked in behind the leech.

Trim without tickers?

Main: sheet in and/or vang on until the top batten is parallel to the boom (best sighted from directly below boom!).

Jib: (upwind) sheet in until you start to backwind the main, except in a breeze when you deliberately luff the main to keep the boat flat.

The Groove

A looser jib halyard = rounder jib luff entry = lower pointing In theory, the tighter the halyard, the better you point. But of course, that's too easy because the flatter the luff entry, the narrower the groove! And it is only possible to sail effectively in a very narrow groove on waveless water in a nice steady wind, and even then, you need a very fine touch on the helm since your sail needs to be angled almost perfectly to the wind all the time. Otherwise there will be a major power (= performance) loss. As soon as conditions are less than ideal (waves, puffs, disturbed air, relaxed helm) you must widen your groove by reducing jib halyard tension (which will make your jib luff entry rounder and more forgiving while resulting in a pointing loss that you just have to live with since the alternative is much worse!). A wider groove allows the jib to function quite well even when it is not flawlessly trimmed. If in doubt, reduce halyard tension!



2.11.3 Miscellaneous manoeuvres

In emergencies such as rudder loss or shroud breakage, we do two things immediately:

- 1 luff all sails completely and heel slightly to leeward
- 2 raise the centreboard all the way

This causes the boat to naturally assume a stabilized angle sideways to the wind. If you lose your rudder on a run, heel the boat gently to leeward and the boat will luff up and slow down. Once forward momentum is lost, the boat will become quite stable, provided the board is full up and the sails are left to luff. At this point, you can open a beer and consider how best to cope with your challenge.

Sailing without a rudder:

Here is a skill that is fun to practise and that may really save you and your boat some day, especially if you are sailing in an area where no immediate rescue is to be expected.

Remembering that you can kill forward momentum and relax even without a rudder by luffing your sails and raising your board, pick a light to medium air day and uncrowded surroundings in which to do your practising as follows:

Come to "emergency trim" as indicated above. When forward momentum has been killed, remove your rudder and put the board down about half way. Slowly sheet in both main and jib while keeping the boat level. (I do this by standing in the boat while holding both sheets - for which I have both hands since none is now needed for the tiller!)

On a Wayfarer especially, the main turning effect comes from heel. So if you want to

- go straight, sail flat.
- luff up, heel slightly to leeward.
- bear away, heel very slightly to windward unless you're eager to gybe.

If you feel you're losing control, be ready to heel to leeward and raise the board full up, so that you can start fresh.

The sails too, can help to steer the boat. Using one sail more efficiently than the other, causes the boat to pivot about its underwater centre of resistance. Jib in, main luffing, therefore causes the boat to bear away (relatively slowly, compared to the effect of windward heel!) By luffing only the jib, you will make the boat luff up. Remember that, especially when the boat is moving at a good clip, heel has an instant and severe steering effect, while the sails are the things to use as a fine tuning device. N.B. If things start to get hairy: sails out, board up, leeward heel = slow down. Collect your thoughts and start over again! P.S. You *can* steer with a paddle but the above considerations will make your job a lot easier!

Heaving to

is a very useful procedure that allows you to relax even in fairly wild wind and waves so that you can have your hands free to have lunch, open the wine, light up, whatever. Heaving to is a step up from the "emergency position". It is easier on both your nerves and your sails (which do not flog nearly as much while you are hove to with some vang on as they do in the "emergency position".

How?

- 1 start in the "emergency position" (sails ragging, board full up, little or no forward momentum)
- 2 sheet and cleat the jib in to windward. Then sheet the main about half way in. Push the tiller to leeward to be on the safe side. Vang on such that the leech will not flog;
- 3 As the boat stabilizes in this position, you should be able to release the tiller which will stay to leeward due to the sideways motion of the boat which has no board down. To play



it safe, we also heel the boat a bit (to leeward) to re-enforce the necessary tendency to luff up;

- 4 Leeward drift can be reduced by using about half the centreboard but then the tiller normally needs to be tied to leeward. Especially in puffy conditions, I feel safer with the board full up.

N.B. In very severe and very shifty wind (e.g. small lakes, rivers), I make sure I lounge near the mainsheet and the tiller, and the crew does likewise with the jib sheet - just in case!!!

Approaching a pick-up point such as a dock, another boat with beer, etc. is best done at reduced speed and close-hauled (where speed is easily controlled, and you can put the brakes on effectively by pushing the boom out and backwinding the main). P.S. In my experience, a boat-to-boat pick-up in a breeze is best done by having the boats approach each other closehauled on opposite tacks, and then luff up head-to-wind side by side almost simultaneously. This has numerous benefits, not the least of which is both boats slowing down!

Heavy weather tricks that may come in handy are:

1. In addition to sitting well aft on a run, you can also reduce death roll potential by sailing with your board half down (except during a gybe).
2. In a blow, the S-gybe is essential. Bear away until the boom starts to come over. It's good to have the crew help the boom over. At that moment, briefly push the tiller as if you wanted to abort the gybe. This lets you come out of the gybe facing downwind instead of continuing to turn which causes heeling, a tendency to keep turning, and often, a dump. Once the boat has steadied away on its downwind course, get the board down part way and slowly head up as required.

Medium air practice would help here, too.

3. Another manoeuvre that is best practised in non-threatening conditions is what my Junior Sailors used to call the "chicken gybe": If you'd rather tack than do a wild gybe make sure you don't head up too fast but do trim your main to keep your boat moving through her tack. If you're feeling frisky in a good breeze, try letting your tiller go and just hauling the mainsheet in quickly. This will make the boat pivot under your main without the annoying and sometimes dangerous loss of speed that comes with trying a reach to reach tack without trimming the main. Of course, once you're past head to wind you need to make sure you re-establish quick contact with your tiller.



2.12 The Beaufort Scale of Wind Speed

Based on a "Yachting Magazine" item that was posted in the Vallensbæk Sejlklub after we had attempted to sail race 1 of the '89 Worlds in 22 m/sec, i.e. 44 knots!

Beaufort No.	Seaman's description of wind	Wind speed in knots	Description of sea	Approximate effect on racing dinghy	Psychological scale
0	Calm	< 1	Sea like a mirror		
1	Light air	1-3	Ripples, no foam crests	Crew sit on leeward side of boat or on centerline.	Boredom
2	Light breeze	4-6	Small wavelets, crests have a glassy appearance and do not break	Crew sit on windward side of boat	Mild pleasure
3	Gentle breeze	7-10	Large wavelets, crests begin to break. Perhaps scattered white caps.	Crew ballasting on weather gunwale. Racing machines like 5-0-5, FD may plane.	Pleasure
4	Moderate breeze	11-16	Small waves becoming longer. Fairly frequent white caps	Crew ballasting out hard over weather gunwale. Most dinghies will plane.	Great pleasure
5	Fresh breeze	17-21	Moderate waves, taking a more pronounced long form. Many white caps, some spray	Light dinghies have to ease sheets in heavier gusts.	Delight
6	Strong breeze	22-27	Large waves begin to form. Extensive white caps everywhere, some spray		Delight tinged with anxiety
7	Moderate gale (high wind)	28-33	Sea heaps up and white foam from breaking waves begins to be blown in well-marked streaks along the direction of the wind.	Start reefing main sails small jibs	Anxiety tinged with fear
8	Fresh gale	34-40	Moderately high waves of greater length. Edges of crests break into spindrift. The foam is blown in well-marked streaks along the direction of the wind.	Very difficult to sail, even under jib only	Fear tinged with terror



9	Strong gale	41-47	High waves. Dense streaks of foam along the direction of the wind. Spray may affect visibility. Sea begins to roll.		Great terror
10	Whole gale (heavy gale)	48-55	Very high waves with long overhanging crests. The surface of the sea takes on a white appearance. The rolling of the sea becomes heavy and shocklike. Visibility is affected.		Panic
11	Storm	56-65	Exceptionally high waves. The sea is completely covered with long white patches of foam. Visibility is affected. Small. and medium-sized ships are lost to view for long periods.		I want my Mummy
12	Hurricane	> 65	The air is filled with foam and spray. Sea completely white with driving spray. Visibility very seriously affected.		Yes, Mr. Jones





3 Weather, strategy & tactics

3.1 Weather

3.1.1 The racer's weather simplified

One of the sailors' priorities just after the start is to go "the right way up the beat". How do you decide what is right and what is wrong ... apart from in retrospect that is! Of all the skills we have to learn, this is perhaps the hardest to grasp and so, is too often ignored - except in the excuse-making department, that is!

So how do we make up our minds which way to go, and what the wind is about to do?

Unfortunately, even daily forecasts are not detailed enough to be of much use on the race course, except that they provide valuable background information. This can be added to what we see happening on the course to enable us to make a best guess of what to do.

In fact, we sailors need to know not only what the wind will be doing during the race, but more importantly, what is going to happen to it on the leg we are on. This is never going to be a precise science and so we mustn't become too complicated or too obsessed in our analysis. Our forecast is really only one part of our overall race strategy as boat organisation, crew technique, and boat to boat tactics, all play their part, too. Which of them has priority at any one time, depends upon our immediate needs at that moment. Notwithstanding all that, getting to the first mark in a good position is often everything, and usually decides our finishing position in that race. We therefore need to spend time thinking about our options, and what is likely to be the best way up the beat. Later on during the race of course, we don't have the luxury of that spare time as so many other pressures are heaped on us. Now, although we can feel the wind, we obviously cannot see it. Therefore we have to observe how it affects things around us - clouds, smoke, trees, other boats, etc. Our timetable before (and after) the start, should therefore be:

1 On the journey to the Sailing Club:

- What is the wind forecast?
- Are the clouds moving in the same direction as that forecast
- Could any nearby land mass affect that wind at the surface? (e.g. Is the wind along the shore, or is it offshore or onshore?)
- Are conditions right for a sea breeze to develop (land heating up - gentle offshore breeze)?
- Is the air stream stable (smooth cloud cover and hazy conditions) or is it unstable (cumulous clouds; clouds with jagged bases and good visibility)?
- Could it rain during the race?
- What will the currents be doing?

2 Sailing to the start

- Note wind direction and speed on a regular basis to see if there are changes;
- Is cloud building onshore and disappearing offshore (sea breeze indicators)?
- Is the cloud base lowering as we look to windward (front approaching)?
- Is the current affecting the water (wave heights and tide lines perhaps)?

3 Preparation for the start.

We should sail as much for the beat as we can to check on gusts and lulls, on wind bends and the effect of shorelines, etc. to decide what side is going to pay.

4 Up the first beat.



If one side is paying, we should make a mental note to go that way up the next beat if the environment remains the same.

So, what are we looking out for when we go through these routines?

1 The Weather Forecast and Gradient Winds.

One of the reasons that weather forecasts are only background help, is that the wind they describe is the gradient wind. This is the wind at about 500 metres up which is high enough not to be affected by the surface. However, it is the wind on the surface that we use and this is affected by surface friction. Not only is it generally weaker, but it is twisted to the left (in the Northern Hemisphere). The technical term for wind going to the left i.e. against the sun's direction, is "backed". If it goes to the right, it veers as it follows the sun's direction. Over water, where the friction is less, the surface wind is backed by about 10°. Over land and its increased friction, the wind can be backed as much as 40° over the gradient wind.

2 Wind blowing Offshore.

As the wind leaves the shore, it will veer because of the change in surface friction. This gentle bend to the right can extend for some distance downwind. It can be spotted in our pre-race practice by checking our compass readings as we beat towards the shoreline. The wind increases in strength as it leaves the shoreline behind but becomes more stable as the difference between the gusts and the lulls becomes less marked.

3 Wind blowing Onshore.

There will be no changes in direction on the water near the shoreline. Almost invariably, there will be less wind afloat than could be guessed at when standing on the shore.

4 Wind blowing along the Shore.

If, when you are standing with your back to the wind, the coast is on your right, the differing angles of the surface wind on the land and on the water increase the wind strength just offshore as they merge together. If the coast is on your left, the effect is the opposite as the two breezes separate and reduce wind strength for quite a distance offshore.

5 Gusts and Lulls

Gusts and lulls occur in unstable air and happen when the surface and gradient winds become mixed up. This overturning of the air occurs as surface air heats up and rises, often forming cumulus clouds as it does. It is replaced by cold air being dragged down, bringing the stronger winds from above. As these hit the water, we see the typical darkening ripples. Interestingly, these gusts occur between the clouds. Underneath the clouds, the wind will be lighter because of the updraft. So, if at all possible, avoid sailing under them. Thus, if there are more cumulus clouds to windward on one side, head for the other side of the course.

6 Raining Clouds

These are usually darker than cumulus clouds. If rain is falling under a cloud, then air is being cooled. That air will be falling and the wind will be stronger. So, head for dark raining clouds.

7 Cloud base lowering to windward

This means a front (junction between a warm and cold air mass) is approaching. Winds increase as it gets closer. The appearance of the front is marked by heavy rain. Approach this on port, as the wind will have backed with the approach of the rain. As the cloud base rises behind the deluge, tack onto starboard because the wind will veer by as much as 90°! In the unstable air stream afterwards (lots of cumulus), the wind will become blustery, and we're back into trying to stay away from the clouds!

8 Thunderstorms approaching with their typical anvil-shaped clouds

Obviously the forces creating this lot are pretty powerful. Air is forced upwards at an enormous rate. It is rapidly cooled and then blasts down to hit the water and fans out in very strong gusts. Hailstones only add to the misery!

9 Sea breezes



Sea breezes occur when the air temperature over the land is higher than the air temperature over the sea. This usually happens on a sunny day as the heated air over the land rises and drags colder air in from the sea. The air over the land then flows out to sea and, as it cools, falls to take the place of the air moving towards the shore. We can see the mechanism starting, as cumulus clouds build over the land, and clouds over the sea dissolve. As the sea breeze develops it turns gradually to the right, as much as 50 to 60° by mid-afternoon. This breeze dies away during the evening as the land begins to cool off.

10 Effect of Current

- Weather flowing current - a current flowing against the wind - increases the strength of the wind that the boat is using. It also increases friction between the wind and water and so waves become higher, steeper with shorter distances crest to crest. These waves could slow the boat down somewhat, so it may pay to try and find flatter water even though that means there will be less weather going current.
- Leeward flowing current - a current flowing with the wind - reduces the strength of the wind the boat is using. Because friction between wind and water is reduced the water is flatter as the top of the waves is 'planed off'. Pointing is poor in these circumstances, and speed over the ground is very much reduced. It is a situation very much to be avoided if at all possible! We'll never get all this right every time. But by working through things logically, we can dramatically improve the odds. It will not only improve our finishing positions but it will also enhance our enjoyment.

3.1.2 Dealing with the arrival of a sea breeze

The wind dropped to nothing and then filled in from a different direction. How do you know what to do when this happens? Although the situation described is not an every-day occurrence, it does happen often and we should know what to do. In fact, in two of the most recent UK-Championships (Llandudno '94 and Hayling Island '97), the winner was probably decided pretty early on in the week on the "whim" of the sea breeze. "Whim" is, of course, not the right word, for although places were won and lost as the old wind died and the new breeze filled in, the environment acted exactly as it should have. Consequently, it should have been straightforward to forecast what to do tactically.

Here is what happened:

Llandudno '94, Race 1:

The breeze had been light and fitful all race but on the final port reach the wind died virtually to nothing. The first few boats headed away from the leeward mark on a painfully slow port tack heading out towards the open sea. They expected the sea breeze to fill in from that direction. In it came, gently at first and the first 4 boats carried on out to sea up to and maybe even beyond the starboard layline. They obviously hoped that the breeze would be stronger out there. Boat 5 tacked short of the layline as soon as there was enough wind to get the helm on the side deck. Within minutes all the boats had tacked and were spread out over quite a large area. All were soon up to hull speed. As the wind strength increased it began to veer big time. Soon the windward-most boats were reaching. Unfortunately for them, there wasn't enough wind to plane and so they had very little speed advantage over the leeward-most (still) beating boat. The helm of this boat, realising that the new wind, having defeated the old breeze, was going to continue to veer as it increased in strength, bore away slightly to match the speed of the windward boats. Gradually, and after quite a nerve-wracking time, it became clear that this boat was pulling ahead (the windward boats beyond the 2 Ormes were probably in a stronger adverse tide). All the way up to the finishing line, this leeward boat kept on a good solid full and by reach, whilst for the windward boats the leg became broader and broader and slower and slower.



Hayling Island, Race 4:

A light wind from the SW with cumulus building over the South Downs was the scene as the fleet beat out to the start. At the start itself, the Pathfinder was headed slightly on port as the wind began to drop. Looking to windward, there was clearly less wind on the left hand side of the beat. For a while it looked good for the late starters (including the Pathfinder). The wind was still heading on port and so a good proportion of the fleet tacked right, hoping (eventually) to get the starboard lift. It never came. Whilst these boats were still moving in the old breeze, a new wind filled in from the South - exactly where it always does at Hayling! However, because the old breeze refused to die on the right of the beat, the new breeze front took ages to track downwind. The early starters were now virtually all on port tack, being freed and were up to hull speed. By the time the late starters had crossed to the new breeze and to the windward mark, these leaders were way beyond the gybe mark. Then, as always happens on the South coast on a sea breeze day, the wind gradually veered and increased in strength.

What lessons can be learnt from these 2 races?

As Llandudno proved, sailors should always tack short of the layline in a new wind, having already tacked towards the favoured side of the beat. Then, if it continues to free they will have gained truck-loads. Even if it doesn't, they won't have lost anything and if the old breeze decides to make a comeback, they are in the right place to take advantage of it.

By the way, this rule also applies in an ordinary steady sort of windbend beat - just like the ones you get for example on a sea breeze day at Looe. Then the tactic is to tack about 60% into the bend - although guessing where the 60% point is can be tricky!.

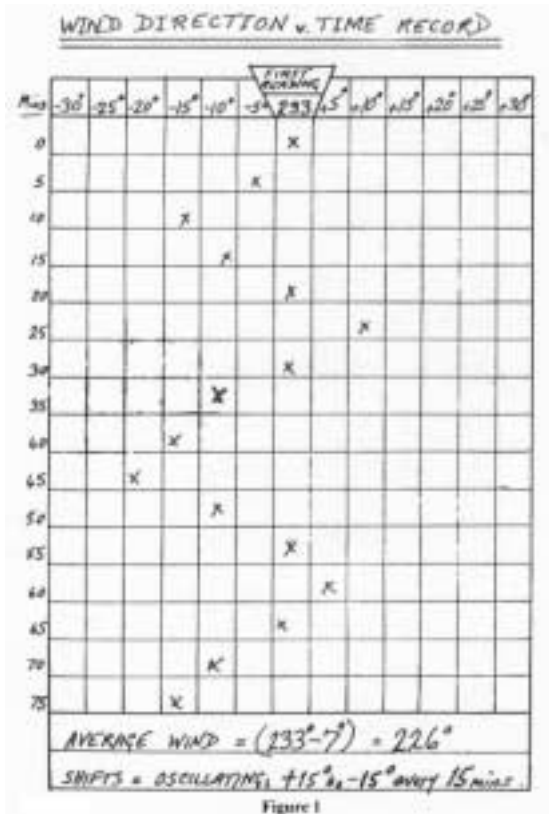
As Hayling Island proved on a sea breeze day, sailors should always use the last vestige of the old dying breeze to tack towards the sea - towards the area where the wind is dying most. That is where the battle between the old and new winds is being fought and lost - usually by the old wind.

Interestingly, this was beautifully demonstrated at the Cadet Worlds in Australia earlier this year when the morning land breeze died away to nothing. With a "wham" the sea breeze then filled in from the opposite side of the course and within seconds was up to force 4 in strength. Get left at any cost was the order of the day as the land breeze died, because once the sea breeze came in, those left hand boats could spinnaker plane into (what had been) the windward mark!

3.1.3 Windshift tracking before the start

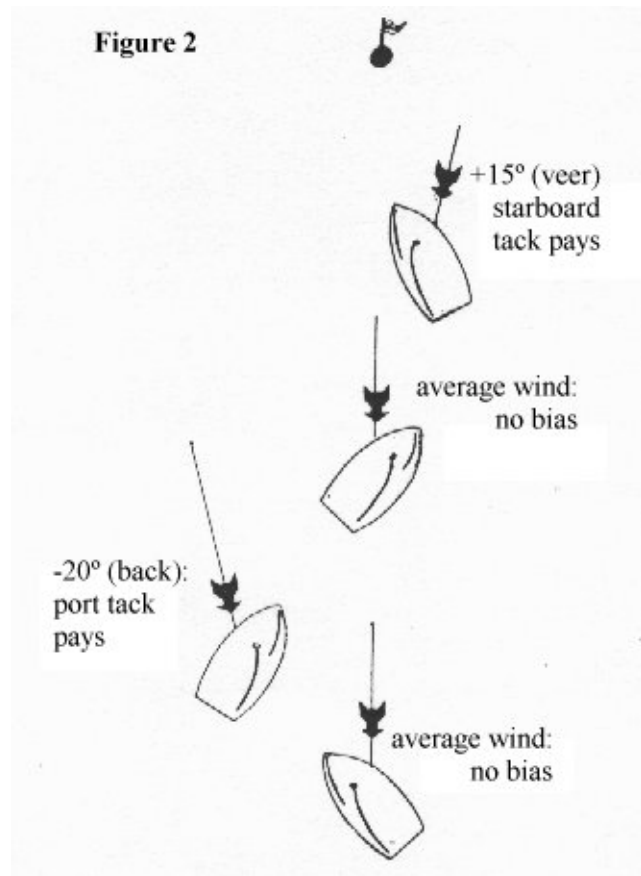
Although getting the most speed out of your boat is important when beating, massive gains can be made by reading the wind properly. Equally, distance can just as easily be lost by getting it wrong. As we all know, the wind is constantly changing in both speed and direction. These changes may be oscillating shifts which continually return to an average or mean direction, possibly at very regular intervals or they can be biased shifts where the mean direction is also changing, perhaps as it follows the sun in the course of a day.

This is very common on sea breeze days, for example on the South Coast of England. There may also be massive sudden shifts which change the whole character of the race. Further complications occur as the wind bends around topographical features such as cliffs, hills, large buildings or trees. It can even change in direction as it leaves the land and blows across water. The key to understanding and using shifts to best advantage is observation and recording. If you want to pick up regular oscillating shifts or a gradual direction change, you need time and a constant reference point.



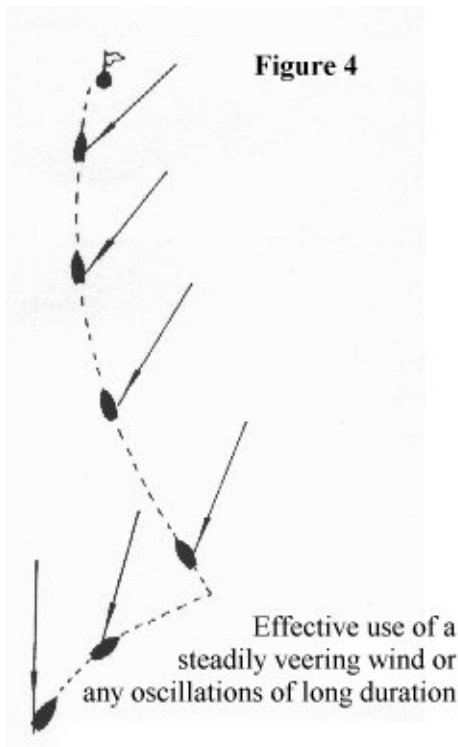
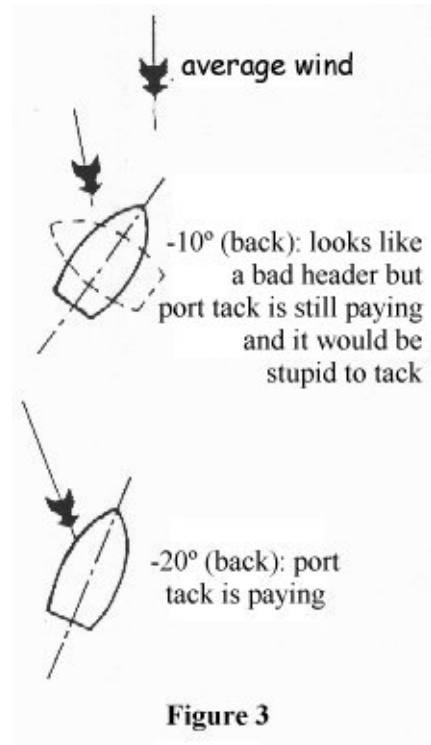
Easily the best reference is a compass but transits can be used on enclosed waters. A recording diagram shown in *Fig. 1* is valuable but quite a time is needed to make a worthwhile survey. The object of the exercise is to take wind direction readings every five minutes. The simplest method is to go head to wind and when the boom is amidships read your compass course. Completing the form like *Fig. 1* will show which of the various types of shift you are having to deal with.

If you discover that you have shifts on top of an average direction, you can establish your best heading on port and starboard tacks when the wind is in the average direction, then ensure that during the race, you spend time on each tack according to the favoured side of the shift (*Fig. 2*).





Knowing the mean direction also prevents you making that easy mistake of tacking when you are headed (i.e. forced to bear away) by a shift which is still on the good side of average (*Fig.3*).



So, if your research uncovers a changing basic wind you will need to set off on the tack which is suffering headers and ride out a few before tacking, then gain lift after lift to bring you quickly up the windward mark (*Fig.4*). Wind bends (i.e. a constant and persistent shift in direction as you sail into it) are actually quite easy to spot. They can be discovered by beating up the course, noting your headings. If these show a gentle but constant change, perhaps as you approach the shore or headland then you know that you are in a bend. This is obviously easier to do at Championships but tough to organise before weekend races, when time is short. Then chatting up the locals or even just a common sense interpretation of the environment will have to act as substitute.

The rule then, just as with a changing basic wind is to sail towards the bend taking the knock. Do not tack early because you will be on the outside of the bend taking the great circle route to oblivion. On the other hand leaving it too late and overstanding will bring other boats up underneath you.

The trick then is to tack a bit earlier than you would normally do to lay the mark (*Fig. 4*). You can always tack back again later if it looks as if you are falling below the mark and still find room in the boats stacking up on the starboard layline.



Don't forget also, that you must consider whether tidal streams or waves will override these windshifts, especially in light or heavy conditions. So make a note of the current direction and always try to keep it on your lee bow. We'll talk about this in our next article⁴².

Finally, the best way of thinking of headers and lifters is: a header is a change in wind which forces you to bear away from your previous course and therefore to sail further away from the windward mark, whilst a lifter is, funnily enough, exactly the reverse!

3.2 Strategy & tactics

3.2.1 Upwind: priorities

The First Quarter of the Beat. Even though you may not have heard it because there was so much other noise, the starting gun has gone (at last), and you have a reason for being. You have to get to that first mark and need to shift into 'race mode' quickly. Decisions made or not made in the next few moments are critical, often deciding your finishing position. If you choose carefully, you can lead the pack, whilst if you take the wrong option, you'll be catapulted backwards through the fleet.

So what are these choices? They are in fact pretty simple and revolve around:

- 1 The need for clear air;
- 2 Making sure that the boat is up to speed;
- 3 Getting into 'sync' with the windshifts;
- 4 Going the right way up the beat.

How you implement these choices, and how you choose which is the most important at any given time, will depend upon what the wind strength is, and how good a start was made.

1. Clear Air

The lighter the wind, the more important the need for clear air. Those who made good starts, perhaps because they started just away from the main concentration of boats, will make massive gains as they easily come up to speed. If they have space to leeward, they can sail marginally freer to ease out in front. They are the lucky ones.

So, what about those boats who didn't get a good start? How do *they* get clear air? Well, the answer is that they must start hunting - and hunting straight away. They will be in less wind, so should ease kickers, sheet loads, etc. They should not try to point. Foils do not start working until water flows over their surfaces. So a boat going slowly, is a boat going sideways, falling into the dirty water and dirty air of the boats to leeward. Go for the best speed you can.

Just after the start, the majority of boats are on starboard. It will be impossible to break through to leeward of them. So, as soon as you can, tack. Tack sensibly and keep the boat moving. Panicky and awkward tacks only make things worse. Then take transom after transom, if necessary. You can easily break through the dirty wind zone, but don't forget to ease the sails if you have to bear away.

Once an area of clear wind is found, begin thinking about the wind. Try to stay in touch with the shifts, deciding whether you have to go one way or the other up the beat. But keep looking to windward. If there is a flag (*masthead fly*) pointing at you, and you're within five to six mast lengths, then you are being covered. So, start hunting again.

Word of warning: Do not tack so often that you lose speed. Better to be in dirty air for a moment while you get the boat moving. Then, when at a reasonable speed for the conditions,

⁴² Al Schönborn's note: Mike and I are still arguing over this one. I'm of the opinion you can only lee bow the tide if you're in water that's shallow enough that your centreboard is in less adverse current than your hull!



tack. Don't forget to look over your aft shoulder (especially when on starboard) just before you tack. There's nothing worse in this situation, than having to tack twice in succession. If there's a boat there, and he's too close, just bear away to create a gap (and speed) and then, after tacking, duck his stern.

2. Boat Speed

As you all know, boat speed is always important, but perhaps not as essential in shifty conditions. It's only in steady winds that it really comes into its own.

Remember that there is going to be much less wind and more of a confused sea in the congested start area. So, as you approach the line, you have to ease off from your pre-start settings - settings made in a smoother sea and stronger winds. This rule applies even to the front markers, because the wind lifts away from the surface as it approaches the massed fleet. Then, as the fleet spreads out, start to increase the loadings again. Take extra special care to keep the boat level, as heeling forces your sails into the backwind of the leeward boats. Watch out for fore and aft trim - perhaps sitting slightly forward in the lighter airs and moving aft as the fleet spreads out. Remember to constantly monitor speed by comparing yourself with other boats. The golden rules are:

- Make leeches tighter (without flattening sails) to improve pointing;
- Open out leeches and flatten sails to get more speed.

3. Getting Into 'Sync' With Windshifts

Most of the sailing you do is in shifty conditions where the wind oscillates about the mean. So, as you clear the line, begin using the information learnt in pre-race practices. What is the wind doing compared with the mean? Is the wind heading or lifting?

If you are on a significant header, tack if you can - even if it means ducking a few stems and losing some ground in the short term. You'll be ahead of the boats you had to duck, when the wind heads back and you tack again onto the new lift. If you can't tack, don't worry too much. Just sail through the header, take the next lift and then wait for the next header before going. Easy to say, but much harder to do. What usually happens is that you spot the header but can't tack because of boats on your windward quarter. You start to fret, and as your sailing goes down the tubes, the situation is made much worse than it really needs to be. A much better solution would be to shrug your shoulders (leave the fretting to others) and cope with what you've got.

4. Going The Right Way

Perhaps more accurately, this should be entitled "Getting Ready to Go the Right Way". In fact, this is often overlooked in the urgency of a short term gain. For example, in a gently bending breeze, many sailors hang on and hang on to the outside of the bend rather than tack and duck transoms. However, as it will pay to get on the inside of this windbend, it is vital to tack onto the header, again ducking sterns if necessary. Remember that because you are sailing into the bend, you'll soon be ahead of everyone you duck.

The same tactics, interestingly enough, should be adopted in tidal situations where the need to get out of (or into) the current overcomes virtually everything else.

- If you are going the right way, insisting on your starboard rights and forcing port tack boats to tack onto your leebow is absolutely ridiculous. Just think how you will feel as you tack away. By the same token, always duck the starboard boat if you are on port and going the right way.
- If you are on the wrong tack however, try your hardest to force the other one onto the wrong tack. The port tacker will have to be made to leebow you so that you can tack off. The starboard tacker will have to be leebowed vigorously to force him to tack onto the wrong tack. So, it's a pretty demanding time for you. But if you get it right, the rewards are



enormous. You'll be ahead of the pack and able to move without pressure on to the next stage - the rest of the first beat including that oh so important final approach to the windward mark.

3.2.2 Upwind: on open water

In editions of "Alive", Al Schönborn responded to a letter from an Inland sailor relating to things that have to be done differently when sailing on the sea. Part 1 is outlined below and deals principally with the upwind legs. Part 2 deals more with the downwind legs.

You shouldn't worry too much about those "open waters" because after all, they are only a bigger version of what you are already sailing on. So what if the legs are longer and the waves bigger? The wind will be steadier and less fluky. As for the tidal current, well, it is not that strong and anyway, it gives an extra interest.

Sailing on inland venues gives a sense of security in that there is always land around. The land also gives us bearings and provides information on our heading when beating. Small venues also mean that the legs are short and there's lots of mark-rounding action. The constantly shifting winds mean that we have to tack and tack again to make the most use of the variations. However, we rarely have enough room to give us time to wind the boat up into the "groove" to maximum speed.

Still, the skills developed inland can be adapted for sailing on the sea. All we need to do is:

- 1 Develop a system to make sure that we are making our best headway to windward even though there are no easy reference points around (apart from other boats that is!)
- 2 Develop techniques to minimise the effects of waves when beating and maximise their help when offwind;
- 3 Develop a sense of the overall picture so that it is almost as if we are looking down from on high at the race course. We can then create a strategy for getting to the next mark as quickly as possible, taking into account the effects of both the (distant) land on the wind and of the tidal currents.

At first glance it seems that all three skills revolve around what is happening to the environment outside the boat. We can't of course control that environment. So at best, our job is to cope! However, we also have to monitor what is happening inside the boat and constantly question whether it is going fast enough. After all, it is no good going the right way up the beat if the boat is going there slowly.

Two areas of responsibility:

1) the shortest distance.

This means making the most of any wind variations that occur - even offshore. For example, if we were to sail on a 10° header ("knock" in North America) for half a mile, we would be 150 metres downwind of where we should have been. Now, no one is going to be daft enough to do that all in one go, but it is all too easy on a mile-long beat to build up that sort of deficit.

Remember Mike Holmes' famous saying after a fluky offshore wind had places changing all over the place. He said "if you got it wrong, you heaved to for a bit. If you got it really wrong, you heaved three..."

So, how do we organise our heading so that we are always on the tack that is getting us to that windward mark quickest. Further on we have talked about the importance of Windshift Tracking ("Alive" No. 87-Spring 1997). If you remember, we should decide before the start during several practice beats, whether the wind is oscillating about a mean or is progressively shifting one way. Both need differing strategies.



In an oscillating wind, aim to stay on the lifted tack pretty much in the centre of the course. Avoid either wing like the plague because it is so easy to get dumped! The best way to decide on what the wind is doing is to use a compass to monitor the boat's close-hauled track. As the helm is busy getting the boat through the water, reading it has to be down to the crew. He must be able to see it easily even when sitting out and so it should be mounted somewhere at or above deck level near the mast. It is pretty straight forward stuff. All the crew has to do is note the heading on each tack and then, as a gust or lull comes through, see if it changes. It is not long before a picture emerges of what is the middle of those changes. All the crew has to do from then on is to call out when the heading goes up or down from that mid-point or mean by using expressions such as "up 5; up 10; mean; down 10; down 5; and so on. Remember that the aim is to stay on the lifted side of the mean. So, if the boat's heading takes a knock, then tack. This enables the boat to take advantage of the lift on the other tack and so still stay above the mean, thus getting us ever closer to that windward mark.

Slavishly following the compass to the exclusion of our other senses can however, be fraught with danger. For example, it is all too easy to tack every time there is the slightest header. Sometimes these can be "false" headers caused by changes in wind strength or by the boat wandering through waves. Therefore, always wait until it becomes a significant knock of at least 10° or so before tacking. Another danger in tacking too often, is that the boat doesn't have time between tacks to build up speed again. This is especially a problem in big waves when it definitely pays to tack as little as possible. Sometimes, if the boat tacks immediately the header comes, it is easy to sail back out of the shift and be headed instead of lifted on the new tack. Richard and Jenny Thompson proved that when they won the Thursday race at Torquay last year simply because, when lying in second place, they drove deeper into a big port header than the first and third boats. When they finally tacked, they had gained some 50 metres in as many seconds. What we mustn't do now - with all this concentrating going on - is to lose track of where we are on the race course. Take every opportunity of getting back to the middle even if this means sailing a mean course from time to time. This keeps our options open and we are ready to grab any bigger shifts that come through. If an incentive is needed to do this, just imagine the horror of making the final approach to the mark on a header as boat after boat on the (opposite) freed tack pours across our bows.

How we should sail a progressive shift. Often referred to as a windbend, it is even more straightforward than coping with oscillating shifts. If the compass readings are showing that there is a persistent (although often gentle) change in the boat's track, then sail towards the inside of the bend even though the boat is being headed. Then tack just short of the layline just in case the bend continues to develop and brings up all the hordes from below. Apart from the compass, there are other rather less sophisticated ways of telling whether the boat's heading is changing. On sunny days for example, the play of shade across the sails is a good indicator. Also the position and angle of other boats is of utmost importance in judging how we are going. Unfortunately, it is all too easy to become obsessed with this and think that every one else is on a freer. The danger then is to decide to chase every one else's shifts. By the time we get there, the shift has gone. This is a passport not only to frustration but also to the back of the fleet! Inland sailors often struggle to come to terms with the fact that, on open water, it usually pays to stay on the freeing tack despite being covered. It is usually better to be going in the right (i.e. shortest) direction on a freer even if slightly down on speed because of the other boat's interference. Tacking onto the header maybe better for speed but the extra distance is usually just too much.

2) **Waves.** Waves are created by the friction of wind moving over the water and are pushed downwind. The stronger the wind, the bigger the waves, especially if the wind is against the tidal



current. Interestingly, it is only the wave that moves downwind because the water stays where it is and simply rotates in a circle. The best way to think about the way it works is to "flick" a length of heavy rope which is being held at both ends. Soon "waves" are working their way along its length even though the rope itself clearly is not moving. When sailing upwind, waves are speed-reducing because they are moving against the boat's progress, whilst offwind they are speed enhancing as they give an extra push each time they pass. Our aim therefore is to minimise their damaging effect when sailing to windward, and maximise their help when sailing downwind. It is clearly essential to keep the boat moving with as little energy lost as possible. Energy is lost when the boat is slowed by pitching, by sailing uphill(!), and by the waves hitting the bows.

To reduce the risk of these happening, sailors should move back slightly so that the crew is about 25-30 cm aft of the shroud with the helm tucked in behind. This keeps their total weight about the pivot point of the hull and lightens the ends. Next, as the boat climbs a wave, the sailors swivel aft pivoting at the hips. There will be extra weight to the wind at the top of the wave, so an extra sitting-out effort is needed to keep the boat flat. Then, as the boat eases down the back of the wave, the sailors pivot forward again. Total movement of this fore and aft sway is about 50 cm.

Al Schönborn has never been a fan of trying to steer through such waves because it is just too easy to get out of sync and stop totally. Then, with the waves piling up against the boat, it takes ages to get going again! However, the boat will tend to luff up slightly as it climbs a wave as the force of the wave's movement heels it slightly. Then that extra bit of effort at the top brings the boat back upright or maybe even over upright to make it bear away and slide down the back of the wave. This slightly meandering course through and over waves is absolutely necessary. That is why it is so important that the helm does not grip the tiller extension so tightly that the rudder can't move. Aim to have a loose grip with what could be called a "weak" arm so that the rudder can move as it follows the boat's movement. The analogy in horse riding terms would be that the boat is given its head to find its own easy way through the wave obstacles.

Do beware of the sailors sitting out so hard that they hit the waves. It is a very effective way of coming to a halt. So is the boat hitting several waves, one after the other. Indeed, there may come a time when the speed of the boat and wave are so equally matched that water is no longer flowing past the hull. The foils stop working and then the boat skids sideways. When this happens, ease the main, then sit out and, using minimum rudder (because it will hardly be working anyway), bear away and get that speed going again.

Finally, when tacking, try to choose a flat spot or at the very least, the back of a wave to give the boat a chance of getting round and going again before the next wave comes.

3.2.3 Upwind: nearing the windward mark

Approaching the windward mark in a big fleet is nearly always hectic. Sometimes it's even chaotic, and occasionally, when anarchy reigns, it's downright dangerous. However, there are a few simple rules which can help to find the best way around the mark.

Rule No. 1

It very rarely works to approach the mark from a long way off along either the port or starboard laylines, because as soon as you get locked into that long, long tack, either the wind shifts or other boats affect you. If, for example, the wind heads and you are no longer heading for the mark, it isn't long before you sag down into the dirty air of leeward boats. It's also difficult psychologically as you watch boats that were to leeward and probably behind being able to tack onto the lifter and cross in front. Of course, it then becomes even worse when they tack back to cover you!



It could be argued that when the wind heads like that, you should tack. But what happens if the wind goes back? You will end up overstanding when you tack back again. It also means that you break the cardinal rule of sailing, i.e. almost invariably you should take the tack which takes you closest to the mark.

If, on the other hand, the wind frees when you are right out on one or other wing of the beat, you end up overstanding the mark. Then, not only have you sailed further than you actually needed to, but leeward boats that were behind now come up (and up!) until they lee-bow you. This often happens. Even if the wind doesn't shift, it is very difficult to judge precisely your final tack when more than 200 metres from the mark. Just think how many boats can fit into a 20 metre space if you overstand/under-stand by only 10%. It can be the difference between a good place at the finish or being "down the pan"! Not only that, if you are locked onto that long tack, how do you cope with boats that tack on your lee bow? You'll have to learn to cope because you are going to be in dirty air for a long time!

Actually, that's not quite right because it's not long before all that dirty air means that you can't lay the mark and then you really are in trouble. There are too many boats around to be able to manoeuvre easily and certainly too much disturbed wind and water to be able to move quickly. Of course, this effect is even worse when approaching the mark on port because any leading boats bearing away on the first reach will also cause trouble. They not only have the right of way being on starboard, but because the sailors are getting things organised for the reach, they will have their heads inside the boat and probably will not be looking where they are going! Also as they accelerate their wash increases and it becomes harder to punch through all that confused sea with only disturbed air to drive the boat.

Rule No. 2

Never ever approach the mark so that you have to tack within the "two hull-length circle". Racing rule 18.3 has been designed particularly to stop boats sneaking in on port and then trying to tack in front of the starboard hordes:

18.3 Tacking

If two boats were on opposite tacks and one of them tacked within the two-length zone to pass a mark or obstruction, rule 18.2 does not apply. The boat that tacked

- shall not cause the other boat to sail above close-hauled to avoid her or prevent the other boat from passing the mark or obstruction, and
- shall keep clear if the other boat becomes overlapped inside her, in which case rule 15 does not apply

It is such a strong rule and is so easy to prove for the protestor. All he has to do is get witnesses to say that they saw his jib back (i.e. he went above close-hauled) and his case is proved.

Rule No.3

Be prepared for less wind as you approach the mark because the press of boats acts as a barrier. The wind, trying to clear that obstacle by taking the easier route up and over, will lift off the water approximately 2-3 mast heights to windward of the fleet. So even the windward boats have less wind. Therefore everyone should reduce kicker and sheet loadings and be prepared to sail freer.

Rule No.4

Almost invariably, it pays to overstand the mark by a boat length or so. It is so much better to be able to bear away rather than to have to put in two extra tacks.



In any case that extra distance to windward means that as you bear away to go round, the boom can be eased well away. As the centre of effort goes forward in the sail plan, the boat bears away automatically without the sailors having to fight it.

If there are other boats around, then at least by being to windward, you have the best of what wind there is, and are affected less by the turbulent wash.

Rule No.5

Keep it simple, what this really means is avoid trouble by spotting the dangers before they occur. In other words think ahead. There is no point in insisting on your rights for example, if it means getting locked into another boat and stopping. The golden, golden rule is always bail out early. The longer you delay, the worse the problem will become.

These rules do not, by themselves, guarantee a trouble-free rounding but they can certainly help to keep the heart rate down to manageable beats!





4 General Racing Tips from the Experts

4.1 How does Mike McNamara do it?⁴³

Mike McNamara observations from his and Simon Townsend's victory in the 1992 Worlds Michael McNamara shares his magic in a exclusive interview. Martin Wood and Al Schönborn put the questions.

Preparation: *Can you outline briefly how your prepared for this year's World Championship?*

Both Simon and I were pretty fired-up this year, we wanted like mad to win the Worlds. In fact 1991 had been a pretty quiet year for us, so we came to this Spring raring to go. Following the Nationals at West Mersea, we knew we had pretty good speed, especially upwind in a breeze, but felt vulnerable on the run, particularly in light airs. This could be largely attributed to the fact that both of us like a good breeze and (probably!) our combined weight of 178 kg. We also knew that we could go fast to windward in very light winds, providing we set the boat up correctly beforehand.

There were several Open Meetings and Area Championships in the two months between the Nationals and the Worlds, and we sailed virtually every weekend against top competition. In these events we tried various modifications, logging the results, and tried to build up enough knowledge of the rig and sails to enable us to "change the gears" quickly when needed. Among the things we tried out were:

- 1 A small-diameter mast pivot pin - this was quickly rejected as we found it difficult to get the same mast settings again during a race once we had altered rig tension;
- 2 Straightening the mast to enable us to keep the genoa luff tight and give more "power" to the main-sail in medium breezes. This was rejected after the last race in the Southern as we couldn't open out the main leech and the excessive backwinding and panting at the front of the mainsail kept shaking the wind off the sail. We discovered that we had probably been sailing with too much rig tension; during the first race in the Worlds we were unable to get full rig tension, and as we had more mast bend and a slacker forestay than we liked, we had to sail with the jib sheet eased more than usual. The boat suddenly felt really good - the air was not being shaken off the main every time we hit a wave - and the helm was light;
- 3 A crosscut spinnaker which with its saving in weight gave us more speed on the run in light winds. (See 3.1 Sail trim and sail care);
- 4 Raising the spinnaker pole eye on the mast by 200mm. This was a major im-provement. I'm a great believer in keeping the pole as near a right angle to the mast as possible in order to project and spread the spinnaker to its maximum size;
- 5 New mast - I noticed that our mast was split in front of the pivot bolt hole, so a fortnight before the Worlds we fitted out a new spar. This was marginally stiffer and helped our offwind speed considerably;
- 6 Homework: As I hadn't sailed in Hayling Bay for many years we decided to spend a couple of days out there just sailing around. Also, we were loaned a "Top Secret" set of tidal data and spent a long time studying these and trying out this knowledge in the bay
- 7 Finally, for peace of mind I decided to have the boat re-measured.

So, by the time we got to Hayling we knew what we had to do to set the boat up for most wind conditions and consequently could change gear fairly quickly.

⁴³ UKWA News #56/57 Winter 1992 & Spring 1993



Boat and Foils: *To the interested observer, your boat appeared to be immaculately prepared in every respect, especially the foils, which were both glass-sheathed. You were also using the older, shallower rudder blade. Can you explain your thoughts on foil shape and stiffness, and perhaps suggest how the efficiency and longevity of Wayfarer foils might be further enhanced?*

Before the Worlds I spent a lot of time working on "Cordon Rouge". I took all the fittings off during the winter and repainted and revarnished her. All the fittings were checked before being refitted. It actually took quite a long time and I only finished on the Thursday before the Nationals. A bit close for comfort!

As "Cordon Rouge" is my third Wayfarer, the fittings are exactly as we wanted. In fact they all work well and come easily to hand. In the weeks before the Worlds I replaced most of the load-bearing control lines, halyards, etc. During the winter I modified the plate case to the new packing-piece rules and got a new Edge glass-sheathed cedar centreboard. Unfortunately, we ran out of time and the new sheathed rudder blade didn't arrive in time.

Despite the occasional stall on a screaming reach, I still prefer the old rudder shape as I feel that the new design has too much frontal area. For the same reason, I think the thinner the better. There is of course a bit of a worry that it may break! In the last two years we have broken two of the mahogany rudder stocks and so were glad to hear that the rule on plywood stocks would be enforced at the Worlds. I use an adjustable extension so that I can alter the length for different conditions - longer for light weather so that I can sit further forward. It is very important that the leading edge of the centreboard is as close to the 83° maximum as possible. Despite checking ours about 40 million times we found that we could have gone down another degree when it was check-measured at Hayling. The Wayfarer board is very large and is prone to twisting. That's why packing the case is so important. It mustn't, however, be too stiff. But to actually quantify how much bend and twist to allow is impossible. I suspect that no matter how stiff we aim for they will still bend...

I did not fill the front of the case to conform to the shape of the leading edge of the plate as I didn't feel that it was legal. This has now been confirmed by a ruling of the Technical Committee. One snag with using a glass-sheathed cedar-cored board is that you must not run aground. Luckily the Worlds were held at sea and not in Chichester Harbour.

Sails and Rig: *Can you describe the shape and construction of the sails (including spinnaker) you used at the Worlds, and compare them with those you make for other members of the class?*

We used a standard main and genoa made in 180 gram HTP squared Polyant Polyester. This is fairly light but has a good resistance to stretch. The main was actually second-hand, as an inland customer found the cloth too stiff for him to "read" and so I swapped it for a softer sail. As I didn't have time to make another sail for the Nationals I used it there and decided to carry on with it into the Worlds. Our genoas go well at sea with the sheet slightly eased. Simon is really good at this and constantly adjusts the tension, keeping the top windward tuft just working. We sail with all three windward tufts angled up at least 45 degrees. He pretends that this is all quite an effort and I recently overheard him telling someone that all he really does is to keep the jaws on the jam cleats "clicking" away. If I hear that, then apparently I'm happy. Hmmm! There is quite a weight saving in a crosscut spinnaker so we measured in two: a 1-ounce and a ½ ounce. As it happened, we never used the ½ ounce. Normally it takes about 3-4 races to "wear" a new spinnaker in. So we were lucky I suppose, that the first race, being so windy, did it in one! After the first race at the Worlds, we kept the rig tension fairly slack even though the genoa luff seemed to sag more than we would have liked. I actually slack-ened the forestay because it looked so wrong.



With the mast fully chocked at deck level we had approximately 2 cm ($\frac{3}{4}$ "") of pre-bend. On the breezy days we took a 6mm ($\frac{1}{4}$ "") chock out. The mast was very solid sideways at deck level. Our spreaders measure 51,4 cm (20.25") from the mast and we use about 19 à 20 cm (7.5-8") distance from the back of the mast to the straight line spreader tip to tip. I'm really not too dogmatic on these sort of measurements, preferring to make sure that the mast fits the sail. We use the (classic) "rule of thumb" on deciding kicker tension, i.e. that the last 15 cm (6") of the top batten and the boom should be parallel.

Starting: *On almost every start, including some where you were badly buried, you seemed to be able to dig your way out and establish clear air and appreciably better speed than those around you. What is your general policy for good starting and also your favourite "escape route" when things are not looking so good?*

Our starts were generally not too bad apart from the last day when I got it completely wrong. The decision on which end to start includes consideration of the bias on the line, how many other boats are around, and which way we have decided to go up the beat. I never start right at the actual end of the line, preferring to be a few boats along, hopefully hidden by a bulge. Normally, I approach on port tack and hang around until a hole appears near the area I want to start in. However, this is a bit risky and so at Hayling we went for a conservative type of start, gradually trickling up to the line on starboard near the favoured end.

"Cordon Rouge" points really well and so, even if there was a boat close to leeward, we were able to ease out after a while. At this time, it is absolutely vital that the boat is perfectly upright,

a to keep our rig away from the boat to leeward;

b to direct dirty air from our sails into those of the boat to windward.

The first beats were long and so it was relatively straightforward to get clear air reasonably quickly after the start. We knew we were fast to windward and so could afford to duck a few sterns in order to go the way we wanted to. I never, ever commit myself to one side of the course or the other until it is obvious which is the paying side. This meant that, unless it was very windy, we were behind other boats until at least half way up the first beat. In fact we were never well clear at the first mark and often rounded 2nd or 3rd, but better than running the risk of taking a flier up the first beat. So, our speed enabled us to go for safe, conservative (Simon says "boring") starts.

The Crew: *You have been blessed with a talented crew in Simon Townsend for several years. For a helm who is trying to identify a crew for a campaign, what would you say are the ideal physical and mental characteristics to look for?*

I am very lucky to have such a good crew as Simon Townsend. He is the best spinnaker stower I have ever sailed with! We get on very well in the boat, and he has never ever grumbled at me, no matter how badly I have sailed. He's also got a great temperament and when I get uptight, he "switches off" and lets me whither away to myself. This nonchalant stoicism is in fact a total sham. He is very, very competitive and very much wants to win. He's also tall and tells me that he's classically good-looking - cast in an heroic mould. Be that as it may, his size keeps those nasty wet malignant waves away from me.

We've been sailing together for 5 years now and the teamwork is quite good. I like our tacking and much of the success in that is due to Simon's sense of balance, for the boat never comes over on top of me when I sit down. Knowing that you can tack out of trouble if necessary helps one's confidence no end. This is especially so at the start where we may have to tack several times in very quick succession.



Heavy weather gybing at the Worlds was not a problem providing I didn't think about it but just did it. Because Simon is so strong the boom went across and the spinnaker pole was changed over no matter what happened at the back of the boat. Although we are heavy and can suffer on medium weather runs as a result, there are so many things going for sailing with Simon that I just get on with sailing in the conditions. In fact, the Wayfarer is such a good weight-carrier that we get away with it mostly... I think that many boats are sailing much lighter than I would want to.

When beating in a breeze, we sit further aft than most sailors. Simon has to sit diagonally with his legs in front of the thwart but most of his torso behind it. This is especially important because in getting closer to me, he reckons that I can lean on him and at the same time stay drier.

4.2 Stuart Rix as '95 Worlds winner; sailing, .a game of mistakes⁴⁴

1995 Wayfarer World Champion, Stuart Rix, shares his sailing philosophy and techniques

It was drummed into me a long time ago that the crew who made the least mistakes inevitably won. Sailing is such a complicated sport of many variables: not only is the boat, the rig, the sails and all the tuning involved, but the water, the waves, the tide, and - as if that is not complicated enough - you also have you, the sailor, with all your anxieties and superstitions, your level of commitment and awareness. If you can get all in tune together then the chances are, due to a confident and calm approach, it is you who will make the least mistakes, and win!

Tuning

The Wayfarer is an easy boat to sail, but a difficult boat to sail well and fast. There is plenty of good tuning data available from both boat builder and sailmaker alike. I have included for amusement at the end of the article, the measurements I used at the UK Nationals 1994.

The 1994 U.K. Wayfarer Nationals in Lowestoft introduced a short chop sea state, especially with the wind in the opposite direction to the tide. For those of us brought up sailing on inland ponds, this can take a while to adjust to. When sailing on inland water, we set up our boats with flatter sails and tight leeches to point higher; but when there is a chop at sea to contend with, it is more important to concentrate on boat speed through the waves than on pointing ability. To this end, I set up my rig slightly more upright and the mast straighter to keep the boat powered up - with the boom on the centreline, no kicker in a light/medium breeze, and the mainsail leech set with a little twist controlled by mainsheet tension. Ease the sheet (inducing twist) when the wind drops or the boat slows, then, when the boat picks up again or the wind strengthens, tighten the leech again to improve pointing ability. The mainsail leech is an important tool for achieving boat speed, and the genoa is likewise played in the same vein.

However, once both the crew are sat fully out, then I start to let the boom off the centreline and progressively use a lot of kicker to keep the mainsail leech from twisting too much. In a Force 5/6 ⁴⁵ the boom is well off the quarter of the transom and being played around this position to keep the boat as flat as possible in any gusts, with the kicking strap (or boom vang) on as hard as I can pull it (12:1 system). The genoa car is moved back 5 cm (2") and the sheet eased 2,5 cm (1").

⁴⁴ UKWA News #63/Autumn 1995

⁴⁵ 20-25 knots



Tactics

So, having got your boat set up well for all conditions, it is now time to forget about fiddling for boat speed (if only we could!) and concentrate on going the correct way: i.e. sailing the best course. It is no good having the fastest boat if you point it in the wrong direction - you only end up in the wrong place quicker!

Let's start at the beginning. If you start well, you have already accomplished 30-40% of the race tactics - certainly in a big fleet. If you do not get away in the first echelon of boats then you are immediately in dirty wind and going slower.

It is very important to be sailing at full speed on the line when the gun goes, ideally with nobody on top of you or beneath you, squeezing you up. It's not easy. It was Gary Player who said "the more I practise the luckier I get." Every now and again you should be over the line, showing how close you are pushing it.

At which end of the line should I start?

1. Where is the line bias? On a long line you can not afford to give everyone the luxury of a head start by starting at the wrong end.

2. Tide/wind bends. Do I want to go left or right, depending on what's going to happen further up the course, and will that modify #1 above?

You need to collect all the information available to you and produce a plan of where to start and which way to go, and more importantly, stick to it.

When it all works

In Race 4 at the Nationals, I decided I wanted to go hard left towards the shore to try to get out of tide, which was over the course. So, I started down at the port end to immediately start going in that direction, got away well and led the bunch of boats who went left. I had a tactical plan, executed it well, was not distracted from it, and eventually won the race.

When it goes wrong

But what if it all does not go well? In Race 2, after a good start, I went hard left and made the Big Mistake (huge!) of overstanding the windward mark by a long way. I rounded the windward mark 12th/13th with the leaders long gone. Now, what I must do, as I am unlikely to win the race, is adopt a policy of minimum damage.

Consistency wins Championships

I therefore sailed the fastest straight line speed (allowing for tide) down the next two reaches, concentrating on surfing on the waves (F4-5), not getting involved with any luffing matches and trying to calm the mind (busy castigating me for being such a plonker up the first beat!) The latter was the hardest to achieve. It took me a complete round before I forgave myself the mistake and got on with the task in hand. Not till then did we start to go quickly again - finally finishing 5th, which proved to be an important discard.

Mistakes will happen. You and I must put them behind us quickly. Having tuned the boat, decided the tactics, then it is down to between the ears to win the race.

Mind over Matter

Several years ago a survey placed sailing and motor sport at the top level of sports demanding a developed intellect. The complexity of these two activities, the sophisticated equipment involved and the variability of the conditions in which they have to operate, make the qualities of knowledge, analysis and logic essential to success. Mix this with the anxiousness of a big race... and the self-doubting "jelly" at the back of the boat is in trouble!



All sailors get psyched out at times. It is so easy to say "he's going faster" or " he's pointing higher." In reality, he rarely is. However; if you keep thinking it, he soon will be! It stands to reason, if you are concentrating on the opposition's boat and not focused on yours, you will begin to slow down. There will be times when he gets a lift or gust of wind you do not - that's the way it goes. You must continue to focus and be aware of your boat, the boats around you, the orientation of the course, the wind, the waves and what the tide is doing. Easy, isn't it? All it is practice and learning from mistakes.

Stu describes the final, deciding race of the Championships

Going into the final race of the Nationals, I stood quarter of a point behind Mike McNamara. I had to beat him over the water and finish in the top 5 to win the Championship. I knew my boat was as fast as anyone's in the breeze of the day and, importantly, so did everyone else. After a number of attempts, the race was started and we got away to a good start, leading the bunch of boats to the lefthand side of the course as planned.

Now to get around the windward mark first and away.. not to be! The boats from the righthand side got there first. We go around 5th and McNamara 7th. My crew reminds me to "settle down and think boat speed", which he had been invaluable at doing all week. Despite making a mistake up the second beat - allowing Mike to cross us - we quickly picked the best course. We knew the boat was fast, so were able to relax and enjoy the sail, the result being that we were second going round the last leeward mark and Mike McNamara was third. Priority one was to stay ahead of him but also to remain in the top of the fleet. We covered hard initially and then eased off to maintain general position and then, in the last quarter of the final beat covered hard again, once second or third position overall seemed assured.

Hence I achieved a goal set a number of years earlier - to win the Wayfarer Championships - through practice and learning from mistakes. We formed a well-tuned boat and crew who, given their day and a little bit of luck, would take the championships from a field of very good sailors. Yes.

How "Mad Savannah W 9363" was tuned

Mast Rake:	716,3 cm (23'6") from normal main halyard hoisted sailing position to bottom edge of traveller.
Mast Bend:	Light/medium wind - 20,3 cm (8") (measured to back of mast from the straight line spreader tip to spreader tip) Heavy wind - 19,7 cm (7¾")
Spreader length:	52,7 cm (20¾")
Chocks:	With 158 kg (350 lb) of tension on shrouds and mast set as above. 2 chocks to firmly fit in gate in front of mast at deck level in all winds except light wind when one 4mm chock removed.



4.3 What not to do: how to lose a sailboat race⁴⁶

The Start:

- 1 *Do not find which end is favoured. Give the other boats a two or three boat length lead at the start!* To find the favoured end, sail on a reach to the pin end of the line and head straight to windward outside the pin. While sitting head to wind, sight across the pin toward the committee boat. If the boat is forward of abeam, the boat end is favored.
- 2 *Do not hoist the spinnaker before the start to make sure it is rigged properly. You were embarrassed to beat everyone to the first mark anyway and you want them to drive over you on the first reach so that you can try to play catch up.* Run the spi up and down at least once before the start. Then store it on the port side so that you can fly it on the first reach of a buoys to port course with no twisted lines, missing pole, etc.
- 3 *Do not time the line.* You may be forced onto the line early and have to reach down the line. If you do not have enough space to reach down the line, you will have to jibe around and go off on port below the whole fleet. Instant last! Sail from the committee boat to the pin, noting the time required. This will usually not change during the starting sequence.
- 4 *ander away from the line in light air. It may take you two or three minutes to get back to the line if there is no breeze. By now the rest of the boats are gone.* In light weather, never be more than 50' or so from the line, preferably close to the favoured end. Be luffing in the right area with about one minute to go. No one can move you if you are not moving very fast and on starboard tack near head to wind.
- 5 *Do not know how long it takes to get from where you are to the line. Guarantee that you will be early or late.* Get a feel for how fast your boat accelerates from a luffing condition and know how long it will take to get to the line from where you are luffing. You can practice this at the committee boat early in the pre-start manoeuvres. Many good sailors hold such a position and accelerate to the line with just 5 seconds left;
- 6 *Start at the port end of the line on starboard tack. If the fleet is headed after the start, you are ahead but sailing in the wrong direction and will get to tack last. If the fleet is lifted, the rest of the fleet is ahead of you;* Find a way to start somewhere in the right-hand 25% of the fleet. This will allow you some freedom to move up the centre of the course
- 7 *Be going slowly as you cross the line. Give everyone else a nice feeling while they grind over you as they cross the line. Instant second row start. Eat bad air for half the first leg.* Make sure your boat is moving at or near top speed as you come across the line. Luff up before the start to get some room below you so that you can reach off a bit to get some speed up. Go for speed over pointing at the start. Once it is safe to do so, you can shift into pointing mode.

First Beat:

- 1 *Stay on starboard and go left. Guarantee that every boat you meet after you tack back will have the right of way. Three or four ducked transoms and you are now three or four boat lengths behind the leaders.* Tack to port when the wind is right and the opportunity presents itself. If everything else is equal, favour the right side of the course. When you meet boats as you come back into the middle, you can force them left or tack on top of them. Either way, the odds are in your favour.

⁴⁶ Earl Schnur USWA Chief Measurer and WIC representative, March 1995 Whiffle & UKWA News #77/Spring 1998, ed. note: What you should only do if you want to lose the race is shown in italics. The winner's approach is shown in regular 'print'



- 2 *ake the short tack first and get onto the layline really early. That way, any lift will have you reaching and going faster than the rest of the fleet. Of course, they will have much less distance to sail, but so what? Take the long tack first (the tack that is at significantly less than 45° to the mark). This guarantees you a benefit from any shift over the boats already on the lay line.*
- 3 *Sail right to the lay line. Make sure that any boat not yet at the layline gets the advantage from any windshift. If you are on the lay line early, a lift has you reaching for the mark and you will be sailing a longer distance than the rest of the boats. A header allows the inside boats to tack and still sail a shorter course than you.*
Stay near the rhumb line and do not go out to the lay line until late in the beat. This gives you freedom to play the shifts and sail the shortest course.
- 4 *Underlay the windward mark on your final approach to it. Be forced to take one more tack onto port with a host of starboard boats coming up. Get a chance to lose four or five boats because of greed.*
Give yourself some leeway at the mark. Hitting the mark is a fine way to spoil your day.

First Reach:

- 1 *Do not look around. Just set the spinnaker immediately. Let the rest of the boats go up to windward and blanket you. While they roar off toward the jibe mark, you lose some more because now it turns out the reach was too tight for a spinnaker. Reach up to windward a bit and get a fix on the next mark. Allow no one to go by to windward of you. Set the spinnaker in slow motion so that it actually happens fast. Go down with the puffs to stay in them longer, and up in the light spots to reach the next puff quicker.*
- 2 *Make sure you are the outside boat going around the jibe mark. That way you can watch all the inside boats jibe before you. Note how well they make their boats go in clear air while your telltales revolve like beanie spinners in their wind shadow. Get inside as you near the jibe mark, even if you have to slow down. This way you will start the second reach with clear air that will keep you in the race and in control of your strategy.*
- 3 *Make sure you mess up the spinnaker jibe. The trailing boats will appreciate the boat lengths this costs you.*
Work hard at perfecting your spinnaker jibes. At the very least, make sure the spi ends up on the new leeward side of the boat after the jibe and get the main and jib drawing immediately after the jibe. As at the start of reach #1, do not let them pass you to windward. If necessary let the spinnaker hang to leeward with the guy pre-cleated while you and your crew fight off those who would steal your wind. Once this is settled, get the pole on and spinnaker away!

Leeward Mark:

- 1 *Do not clear the halyard or take the spinnaker down a bit early. A little excitement with a fouled spinnaker at the mark is just what you need to make the pizza taste better on the way home! Clear the halyard and get the spinnaker into the boat a bit early so that you can concentrate on tactics at the rounding.*
- 2 *Make sure you round wide so that the hot shot following you has room to round up inside you and sail a little higher and a little faster. You'll enjoy lying awake for a few hours with a knot in your stomach, wondering why you did not think ahead a bit. Avoid tacking for a while after rounding the mark even if you have to eat some bad air. Wait until you get up to speed and until your tack will put you into clean air.*

**Second Beat:**

Forget about the rest of the fleet. You know where the wind will be. And you do not like to mix it up anyway. It is always fun to watch the boats that were behind you ride up a lift on the other side of the course while you hobby horse in the power boat swells. Keep a loose cover on your competition. A win by four seconds counts just as much as one by four minutes. They cannot pass you if you stay between them and the windward mark - unless they are better sailors in which case they will pass you anyway!

The Run:

Break out a can of soda, sit on the transom and enjoy life. No race is ever won on a run anyway. Watch the sharp boats ride down the streaks and pass you on both sides! Pay attention to the wind streaks on the water. You will go much faster if you can find and stay in one. If it lightens up, look for another streak and reach over to it. Then run down with it. Sail smart on the runs and soon everyone will be telling you how fast your boat is down wind.

Final Beat:

- 1 *Do not cover anyone since you are way ahead. You have the race won since no one has been able to match your upwind speed all day. Think a lot about that fact as they are handing out the hardware to the two boats that caught you because you did not cover. It is even more important to cover on the last beat because you can make the following boats do desperate things since there is no tomorrow*
- 2 *Do not figure out which end of the finish line is favoured. Who cares? As you zip along the finish line on starboard, you make three port tackers bear off to go behind you. Compared to a thrill such as that, what does it matter that they all finished before you did because you were sailing along the line while they crossed it?! Decide which end of the line is favoured early enough to go there by the shortest possible route. Nothing else matters (as long as you do not foul anyone in the process).*





Annex 1 Wayfarer Class Rules & Constitutions

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SECTION I - INTENTION AND INTERPRETATION

- 1.1 The intention of the class rules is to ensure racing within the class on even terms whilst maintaining the boat's characteristics of constructional strength, ease of handling, suitability for family sailing and day cruising and moderate cost.
- 1.2 The official language of the class is English and in the event of dispute over interpretation the English text shall prevail.
- 1.3 These rules are complementary to the official drawings and specifications. Any interpretation shall be made by the governing Wayfarer National Class Association (NCA) which shall subsequently notify the Wayfarer International Committee (WIC).
- 1.4 The constitution of the WIC governs the procedure for changing any of these rules.
- 1.5 The official drawings and specifications are made and the class rules are enforced (or their enforcement may be waived) without responsibility on the part of any member of the WIC, or any member of any NCA or the designer of the Wayfarer, or the copyright holder for the time being of the Wayfarer design, for any injury, loss or damage howsoever caused.

SECTION II - PROTECTION OF ONE DESIGN AND MEASUREMENT CONDITIONS OF BUILDING AND CONSTRUCTION

- 2.1 Only professional builders holding licences from the copyright holders of the Wayfarer design are entitled to manufacture constructor's kits or build Wayfarer dinghies. A list of such licensees is obtainable from the NCAs. The assembly of boats from constructor's kits or sub-assembled hulls may be performed by amateur builders.
- 2.2 Licensees are required by the licence to produce boats and constructor's kits and parts in accordance with the official drawings and the specifications, issued by the copyright holders to the licensees, WIC and the NCAs, and with these rules.
- 2.3 Hulls and other components moulded in glass fibre reinforced plastics (GRP) shall originate only from official moulds. These are moulds registered by the copyright holders as having been derived from the master plugs. An NCA shall have the right to measure these moulds.
- 2.4 Boats built from constructor's kits shall be assembled from components supplied by the licensees and shall closely comply with the official drawings. Wooden hulls built from constructor's kits shall be built only on registered jigs supplied on loan with the kit. The use of other jigs or components or materials is prohibited. The following wooden items are exempted from the requirements of this rule: centreboards, rudder blades, rudder stocks, masts and booms, but shall comply with the relevant rules 17, 18, 26, 27.
- 2.5 Deviations from the official drawings and specifications are prohibited save for the following:
 - a Running rigging arrangements;
 - b Tiller and tiller extensions;
 - c Fittings;
 - d Reinforcement pads for fittings;
 - e Doublers, tingles or patches required for repairs;
 - f Normal manufacturing tolerances not specifically controlled by the measurement controls in section III of these Rules;
 - g Relaxations or changes made to these rules or the official drawings subsequent to the boat first being measured. This rule also applies to repairs which shall additionally comply with Rule 5 and the Rules of Section III.
- 2.6 Subject to Rule 2.5, amateur or unlicensed builders may carry out repairs and the replacement of wood parts which have deteriorated.



REGISTRATION

- 3.1 The licensee is required by the licence to pay, on each boat or kit sold, the NCA registration fee and membership subscription for one year.
- 3.2 The boat will then be entered in the register maintained by the NCA. On notification of change of ownership the NCA will amend the register without charge.
- 3.3 A boat built in a country having no NCA shall be registered with WIC which shall act as its NCA for the purposes of Rules 2, 4 and 5.

CERTIFICATE

- 4.1 No boat shall be allowed to race as a Wayfarer unless it is registered with an NCA in the name of the current owner and has a valid buoyancy and measurement certificate (hereafter referred to as the certificate). The initial certificate shall be issued by the NCA on receipt from the owner, or his representative, of two copies of an official class measurement form properly completed in accordance with rule 5. One copy will be returned to the owner with his certificate. On change of ownership a fee is payable to the NCA for the issue of a new certificate.
- 4.2 To be valid, a certificate shall contain a buoyancy test endorsement dated within the previous 12 months and shall be up to date in all respects.

MEASUREMENT PROCEDURE

- 5.1 This is a one-design class. Measurement tolerances are intended to allow for genuine building errors and shall not be deliberately used to alter the design. Measurement shall be carried out using these rules. The measurer shall report on the measurement form anything which he considers to be a departure from the intended nature and design of the boat or to be against the general interest of the class.
- 5.2 Only measurers individually approved by the NCA, or belonging to groups specified by the NCA, shall be authorised to measure Wayfarers. Payment for the measurer's services shall be the responsibility of the owner.
- 5.3 A measurer shall not be authorised to measure a boat owned or built by himself or in which he has a vested interest.
- 5.4 Two copies of the official class measurement form properly completed in accordance with these rules shall be signed by the builder, official measurer and owner.
- 5.5 All sails shall be measured. Conforming sails shall be signed and dated by the measurer, and in countries using official stamps, shall also be stamped by the measurer.

COMPLIANCE WITH RULES

- 5.6 The current rules which are not printed in italics shall apply to all boats; except that if a boat made prior to the effective date of the current rules fails to comply with any measurement control in Section III, it shall in this respect comply with the corresponding rules in force at the time when the boat was made.
- 5.7 The current rules which are printed in italics shall apply to all boats irrespective of date of manufacture or installation of equipment.
- 5.8 Any alteration or replacement shall comply with the rules current at the time of the alteration or replacement.
- 5.9 Certain measurements are required to be officially measured and entered in the measurement form, but this does not exonerate non-compliance with the remaining measurement rules.
- 5.10 It shall be the responsibility of the owner to ensure that the boat is measured and to ensure that it continues to comply with the class rules.



REMEASUREMENT

- 5.11 Any certified boat shall be liable to remeasurement at the discretion of the NCA or race committee, but only by an approved measurer.
- 5.12 The certificate is liable to be invalidated by repairs or replacements to items covered by the measurement rules. The boat shall be remeasured in respect of the affected part by an official measurer and the certificate endorsed accordingly. Repairs or replacements will normally be recorded on an official measurement form but in these cases the forms are not required to be recorded with the NCA.

RULINGS AND DISPENSATIONS

- 5.13 Cases of doubt regarding compliance with the class rules shall be referred to the committee of the NCA who shall give a ruling.
- 5.14 An NCA is empowered to grant dispensation in exceptional cases where this is considered to be in the interests of the class. Any such dispensation shall be recorded on the certificate of the boat concerned.
- 5.15 Rulings under 5.13 and dispensations under 5.14 shall be communicated to the WIC by the NCA concerned.

SECTION III - MEASUREMENT CONTROLS

6. TERMINOLOGY

- 6.1 In the following Measurement Rules the term Mark I shall refer to Wayfarers of wood, G.R.P. or composite construction having full depth forward bulkheads jointed to the underside of the foredeck to form the bow buoyancy compartment; the suffix A shall refer to an alternative version of G.R.P. construction having the bow buoyancy compartment divided horizontally to form two separate compartments.
- The term Mark II shall refer to Wayfarers of composite or G.R.P. construction having a forward buoyancy compartment moulding incorporating a part-depth forward bulkhead and horizontal stowage area. The suffix SD shall refer to alternative versions of composite or G.R.P. construction having a self-draining cockpit floor moulding.
- The term Mark III SD shall refer to Wayfarers of G.R.P. construction which are manufactured only in Canada. This design has one inner moulding for the floor, forward buoyancy, side decks, and aft locker excluding locked lid, plus additional mouldings under this inner moulding.
- Series II shall refer to a minor variation on Marks I and II due to the need for replacement tooling.
- The + S has foam construction in the hull and full deck forward bulkheads jointed to the underside of the foredeck to form the bow buoyancy compartment.
- The term Wayfarer World shall refer to Wayfarers of G.R.P. construction having one inner moulding for the SD cockpit floor, forward buoyancy and side decks, plus additional mouldings under this.
- 6.2 The use of the words "maximum" and "minimum" relating to measurements in these rules shall mean that these are the greatest or smallest measurements permitted in each case.

7. ONE-DESIGN INTERPRETATION

Each boat shall comply with the official drawings for its specific Mark and constructional type. Variants using alternative features selected from different Marks and constructional types are prohibited. The permitted designs are:

- a Mark I wood construction
- b Mark I G.R.P. construction
- c Mark I composite construction.



- d Mark I A G.R.P. construction.
- e + S G.R.P. construction.
- f Mark II G.R.P. construction.
- g Mark II composite construction.
- h Mark II self-draining (SD) G.R.P. construction.
- i Mark II SD composite construction.
- j Mark III SD G.R.P. construction. To be built only in North America and to be registered with CWA or USWA.
- k Series 2 Mark 1A G.R.P. construction.
- l Series 2 Mark 1A Composite construction.
- m Series 2 +S G.R.P. construction.
- n Series 2 +S Composite construction.
- o Series 2 Mark II GRP construction.
- p Series 2 Mark II Composite construction.
- q Wayfarer World GRP construction

HULL CONFIGURATION CONTROLS

8. LENGTH MEASUREMENTS

- 8.1** *All length measurements under Rule 8 shall be taken from main aft face of transom.*
- 8.2** Length overall. Excluding fittings. 481,4 +/- 2,6 cm (15'9½" +/- 1")
(Mk III only). Length overall. Excluding fittings: 483,2 +/- 2,6 cm (15'10¼" +/- 1")
(Wayfarer World only). The hull and deck shall not deviate from the official moulds and drawing.
- 8.3** Transom to main forward face of aft bulkhead. 2'7" +/- ¾" (788 +/- 20)
- 8.4** (Wood boats only) Transom to aft face midships deck knee. 6'9" +/- ¾" (2058 +/- 20)
(G.R.P. and composite boats only) Transom to aft edge of thwart. 6'9" +/- ¾" (2058 +/- 20)
(Wayfarer World only). Transom to aft edge of thwart. 6'11" +/- ¾" (2100 +/- 20)
- 8.5** (Mark I, +S and Mark I A only).
Transom to aft face of forward bulkhead. 11'4" +/- ¾" (3455 +/- 20)
(Mark II only) Transom to aft face of forward bulkhead at ¾" (20) from the uppermost edge of the moulding at 4½" (115) from the centreline. 10'10.3/8" +/- ¾" (3310 +/- 20)

9. BEAM MEASUREMENTS (G.R.P. and Composite boats only)

- 9.1** All beam measurement points under Rule 9 shall be measured from main aft face of transom.
- 9.2** Beam measurements under Rule 9 shall be to outer edge of deck, excluding rubbing strakes or fendoffs.
- 9.3** Beam at 2'7" (788) from transom measured from edge of deck to edge of deck. 5'5¾" +/- ½" (1670 +/- 13) (Mk III only) Beam at 2'7" from transom. 5'7" +/- ½" (1702 +/- 13)
- 9.4** Beam at 6'9" (2058) from transom. 6'1" +/- ½" (1855 +/- 13) (Mk III only) Beam at 6'9" from transom. 6'2" +/- ½" (1880 +/- 13)
- 9.5** Beam at 11'4" (3455) from transom. 4'8" +/- ½" (1422 +/- 13) (Mk III only) Beam at 11'4" from transom. 4'9½" +/- ½" (1461 +/- 13)
- 9.6** (Wayfarer World only). The hull, deck and gunwale shall not deviate from the official moulds.

10. SECTION MEASUREMENTS (Wood boats only)

- 10.1** At outside transom.



- (a) Beam to edge of deck. Excluding gunwale rubbing strake and fendoff. 4'2¼" +/- ½" (1277 +/- 13)
 - (b) Beam at angle of upper chines. To outside skin. 3'9½" +/- ½" (1156 +/-13)
 - (c) Beam at angle of lower chines. To outside skin. 2'9" +/- ½" (838 +/-13).
 - (d) Depth, from edge of deck to upper surface of keel. 1'2¼" +/- ½" (362 +/- 13)
 - (e) Depth, from angle of lower chines to upper surface of keel. 3" +/- ½" (77 +/- 13)
- 10.2 At forward face of aft bulkhead.
- (a) Depth. Upper edge of bulkhead to upper surface of hog, forward of adjacent floor bearer. 1'4" +/- ½" (407 +/- 13)
 - (b) Beam to edge of deck. Excluding gunwale rubbing strake and fendoff. 5'5¾" +/- ½" (1670 +/- 13)
- 10.3 At aft face of midships deck knee.
- (a) Beam to edge of deck. Excluding gunwale rubbing strake and fendoff. 6'1" +/- ¾" (1855 +/- 20)
 - (b) Beam at upper chines. To inside skin at upper edge of chine stringers. 5'3¼" +/- ¾" (1607 +/-20)
 - (c) Beam at lower chines. To inside skin at upper edge of chine stringers. 4'2" +/- ¾" (1270 +/- 20)
 - (d) Upper hull panel width. From underside deck at inside edge of gunwales, to skin at upper edge of upper chine stringer. 1'1½" +/- ½" (344 +/- 13)
 - (e) Lower hull panel width. From upper inside edge of upper chine stringer to skin at upper edge of lower chine stringer. 8½" +/- ½" (216 +/- 13)
 - (f) Depth, from edge of deck to upper surface of hog. 1'11" +/- ¾" (585 +/- 20)
- 10.4 At aft face of forward bulkhead.
- (a) Beam to edge of deck. Excluding gunwale rubbing strake and fendoff. 4'8" +/- ½" (1422 +/- 13)
 - (b) Beam at upper chines: To inside skin at upper edge of chine stringers. 3'9¾" +/- 1/2" (1163 +/- 13)
 - (c) Beam at lower chines: To inside skin at upper edge of chine stringers. 2'10½" +/- 1/2" (877 +/- 13)
 - (d) Depth at upper chine: From inside upper corner of chine stringer to upper surface of hog. 12¾" +/- ½" (324 +/- 13)
 - (e) Depth at lower chine: From inside upper corner of chine stringer to upper surface of hog. 5¾" +/- ½" (146 +/- 13)

11. KEEL

- 11.1 Width. *Between side faces for a distance of 13'0" (3963) from the transom shall be 2.7/8" (73) minimum.*
- 11.2 Depth. *From the underside of skin to underside of keel for a distance of 14'0" (4267) from the transom shall be 5/8" (15) minimum.*
- 11.3 Outer corner radius. ½" (12) maximum.
- 11.4 Keel band.
- a *Shall be fitted the entire length of keel and stem to stemhead or stemhead fitting, and on both sides of the centreboard slot.*
 - b *Material. Durable corrosion resistant metal.*
 - c *Thickness. ¼" (7) maximum.*
 - d *Width. ¾" (20) maximum.*
 - e *Additional keel bands. May be fitted, but their weight shall not be included in the hull weight (Rule 25) and they shall comply with Rules 11.4 (b), (c) and (d).*



12. BILGE KEELS

- 12.1 *Length. 6'6½" +/- 1" (1994 +/- 26)*
- 12.2 *Width. 1¼" +/- 1/8" (32 +/- 4)*
- 12.3 *Thickness. 1" +/- 1/8" (26 +/- 4)*
- 12.4 *Distance from keel. Measured on hull surface. 1'5" (432) minimum.*
- 12.5 *Fairing at ends. 4" (102) maximum length.*
- 12.6 *Outer corner radius. 1/2" (12) maximum.*
- 12.7 *Supplementary bilge keels (optional). If fitted shall be of like dimensions to the main bilge keels and shall be positioned approximately midway between the main bilge keels and the keel. Their weight shall not be included in the hull weight (Rule 25).*
- 12.8 *Bilge keel bands. May be fitted to main and supplementary bilge keels, but their weight shall not be included in the hull weight (Rule 25), and they shall comply with rules 11.4 (b), (c) and (d).*

13. GUNWALE STRUCTURE

Gunwale assembly and fendoff if fitted, shall conform to the official drawing, Sheet No 33. The cross section shall be substantially constant from stem to transom except that it may be tapered at the ends for a maximum of 4" (102).

(Mk III and Wayfarer World only.) The gunwale assemblies shall not deviate from the official moulds and drawing. The fend off, if fitted, shall be of uniform section for the full length of the boat except for 4" (102) at bow and stern, and shall not extend by more than 7/8" (22) from the GRP surface of the gunwale produced by the official moulds.

14. CENTREBOARD CASE

- 14.1 *Internal width. 1.1/8" (29) maximum. Packing pieces of constant sectional shape and maximum depth 1" (26) applied to the top of the centreboard box and the bottom of the centreboard slot shall be permitted.*
- 14.2 *Slot in keel.*
 - a *Forward end to outside transom, measured along keel. 9'0" (2744) maximum.*
 - b *Aft end to outside transom, measured along keel. 4'9" (1448) minimum.*
 - c *Slot closure strips prohibited.*
- 14.3 *Centreboard bolt.*
 - a *Aft edge to aft end of centreboard slot, thence along keel to aft face of transom. 8'7½" +/- ½" (2629 +/- 13)*
 - b *Lower edge to underside keel. 3½" +/- ¼" (89 +/- 7)*

15. APERTURES IN HULL SKIN

- 15.1 No apertures in the hull skin shall be permitted save for those listed in Rule 15.
- 15.2 Centreboard slot. Permitted in accordance with Rule 14.
- 15.3 Self bailers. Maximum number permitted shall be two. Maximum aperture in hull skin for each. 11 sq.in. (7100 sq. mm.).
- 15.4 Bilge pump outlets. In topsides only. Maximum number permitted shall be two. Maximum diameter of each 1" (26).
- 15.5 Drain holes in transom.
Maximum number permitted shall be four. Maximum diameter of each 1" (26).
- 15.6 Drain holes in bottom (not permitted in SD versions). Maximum number permitted shall be two. Maximum diameter of each 1" (26).
- 15.7 (Mark II SD and Mark III only). Drain tube outlet ports in transom. Maximum number permitted shall be two. Maximum diameter of each 4.3/8" (112mm). Outlet ports shall be connected with the cockpit in a watertight manner by tubes of maximum diameter 4.3/8"



(112mm).

(Wayfarer World only.) Two drain apertures in transom. Maximum dimensions 8¼" x 3" (210 x 75).

- 15.8** (Wood boats only). Bow attachment point. A transverse hole shall be permitted at the bow. It shall not affect the efficiency of the bow buoyancy compartment.

16. PROJECTIONS BEYOND HULL SKIN

The only permitted projections shall be

- a** *Bow fitting. Maximum projection beyond stem ½" (13)*
- b** *Spinnaker sheet retaining hooks. One, maximum projection from stem 3" (77). Spinnaker sheet reaching hooks not extending outboard beyond the outer edge of the gunwale rubbing strake.*
- c** *Gunwale rubbing strakes. In accordance with Rule 13.*
- d** *Resilient fendoffs. In accordance with Rule 13.*
- e** *Cleats or eyes for fastening covers or lifelines. None shall project forward of the stem band.*
- f** *Keel and bilge keels. In accordance with Rules 11 and 12.*
- g** *Stem band, keel bands and bilge keel bands. In accordance with Rules 11.4 and 12.8*
- h** *Hauling-out plate or eyebolt.*
- i** *Rudder hangings and rudder retaining clip.*
- j** *Name plates.*
- k** *Drain plugs. In accordance with Rule 15.5 and 15.6*
- l** *Self bailers. In accordance with Rule 15.3*
- m** *Pump outlets. In accordance with Rule 15.4*
- n** *Overlap of deck moulding in G.R.P. boats.*
- o** *Pad for outboard motor.*
- p** *Rowlock sockets, abaft transom for steering oar. Maximum number two. Shall not be used when racing.*
- q** (Mark II SD, Mark III and Wayfarer World only). Transom flaps. Maximum number two. To close drain ports permitted by Rule 15.7.

17. CENTREBOARD

- 17.1** *Material. Shall be solid or laminated wood or G.R.P. and shall comply with the official drawings and specifications.*
- 17.2** *Profile. (including any protective bands). Shall conform to official drawing.*
- 17.3** *Thickness. (Including protective coating). Shall be uniform. Maximum 13/16" (21), minimum 11/16" (17) except for permitted chamfer.*
- 17.4** *Chamfer. Shall not extend more than 2½" (64) from any edge.*
- 17.5** *Edges. May be protected by metal or plastic bands of 3/8" (10) maximum thickness.*
- 17.6** *Surface. Wooden centreboards complying with Rule 17 may have G.R.P. protection of approximately uniform thickness added. They shall then comply with Rule 17 in all respects.*
- 17.7** *Weight. Shall not exceed 13.1/2 lbs (6.123 kg). Weight concentration in any particular part of the centreboard is prohibited. This may be checked by flotation.*
- 17.8** *Angle. It shall not be possible to lower the centreboard beyond a position in which its leading edge is raked aft at an angle of 83 degrees to the tangent to the under surface of the keel at its point of intersection with the centreboard's leading edge.*
- 17.9** *Depth. When fully lowered the bottom of the centreboard shall be not less than 3'2" (965) or more than 3'3.5/8" (1008) to underside of keel excluding the keel band.*



18. RUDDER BLADE

- 18.1 *Material. Shall be solid or laminated wood or GRP and shall comply with the official drawings and specifications.*
- 18.2 *Profile. (Including any protective bands). Shall conform to official drawings.*
- 18.3 *Thickness. (Including any protective coating). Shall be uniform. Max. 13/16" (21), minimum 9/16" (14) except for permitted chamfer.*
- 18.4 *Chamfer. Shall not extend more than 2" (51) from any edge.*
- 18.5 *Edges. May be protected by metal or plastic bands of 3/8" (10) maximum thickness.*
- 18.6 *Surface. Wooden rudder blades complying with Rule 18 may have G.R.P. protection of approximately uniform thickness added. They shall then still comply with Rule 18 in all respects.*

18A. RUDDER STOCK

Material shall be wood or metal. Wooden stocks shall comply with the official drawings and specifications. Metal stocks shall conform to the intention of the Class Rules (Rule 1.1) and shall be of a design approved by the local NCA.

DECKS AND INTERNAL LAYOUT CONTROLS

19. DECKING

- 19.1 Foredeck
 - a Stemhead to aft edge foredeck 4" (102) from centreline. 5'7½" +/- 1½" (1715 +/- 39) (MK III only) Stemhead to aft edge foredeck 4" from centreline. 5'9"½" +/- ½" (1765 +/- 13)
 - b Stemhead to extreme aft edge at gunwale. 7'3½" +/- 1½" (2223 +/- 39) (MK III only) Stemhead to extreme aft edge at gunwale. 7'6" +/- ½" (2286 +/- 13)
 - c (Wayfarer World only). Shall be in accordance with the official approved mould and drawing.
- 19.2 Sidedecks. Aft of thwart. Width measured at right angles to tangent to outer edge, excluding gunwale rubbing strake. 8¼" +/- ½" (210 +/- 13) (MK III only) Aft of thwart. Width measured at right angles to tangent to outer edge, excluding gunwale rubbing strake. 9" +/- 1/4" (229 +/- 7) (Wayfarer World only). Shall be in accordance with the official approved mould and drawing.
- 19.3 Aft buoyancy tank deck. (Mk. 1 only).
 - a Shall be flat.
 - b Shall nowhere be more than 2" (51) below the level of the upper surface of the adjacent sidedecks.
- 19.4 Aft buoyancy tank deck. (Mk I A, Mk II and Mk II SD only) Shall be the official aft buoyancy tank moulding.
- 19.5 (Wayfarer World only). Aft tank omitted.

20. APERTURES IN DECKS AND BULKHEADS

- 2.2 No holes through the decks or bulkheads (including the cockpit floor in SD versions and Wayfarer World) shall be permitted save for those listed in Rule 20. When bushes or fittings are inserted, the areas measured shall be those of their internal dimensions.
- 2.3 Hatches. Shall be permitted in accordance with Rule 21.
- 2.4 Holes for fastenings used to attach fittings. Shall be ½" (13) maximum diameter and shall be sealed to maintain watertightness of buoyancy compartments.
- 2.5 In foredeck. Two holes of maximum aggregate diameter 1" (26). Neither of these holes shall be centred more than 2½" (64) from the mast recess.



- 2.6 Shroud plate apertures. Shall be close fitting. The shrouds shall not be permitted to pass through the deck.
- 2.7 (Excluding Wayfarer World). In each side deck structure, apertures shall be permitted in the horizontal and vertical surfaces as follows:
- a Jib sheet control ports. Aggregate area in horizontal surface $3\frac{1}{2}$ sq. in. (2258 sq. mm.) maximum. Aggregate area in vertical surface $3\frac{1}{2}$ sq. in. (2258 sq. mm.) maximum;
 - b Rowlock socket. One only, of 1" (26) maximum diameter. The rowlock socket in the Wayfarer World must be sealed.
 - c Spinnaker sheet control ports. Aggregate area (in horizontal and vertical surfaces together) 2 sq. in. (1290 sq. mm.) maximum.
 - d Handhole. (In Mk I A, Mk II and Mk II SD only). One only, extending not more than 2'3" (686) from the transom. Maximum length 8" (203). Maximum width 2" (51)
 - e Hole for attaching a mainsheet bridle, one only. Maximum diameter $\frac{1}{2}$ " (13)
- 2.8 In the forward bulkhead. Not more than two drain holes, each of maximum diameter 1" (26).
- 2.9 In the aft bulkhead:
- a Not more than two drain holes, each of maximum diameter 1" (26), below the level of the cockpit floor.
 - b (Mark II SD versions only.) Not more than two drainholes, each of maximum diameter 1" (26), above the level of the cockpit floor.
 - c (Mark II SD/Mark III only). Not more than two inlet ports each of maximum diameter $4\frac{3}{8}$ " (112mm) connected in a watertight manner with the transom by the tubes permitted by Rule 15.7.
- 2.10 *Closure. All apertures into buoyancy compartments shall be effectively closed in a watertight manner when racing.*

21. HATCHES

- 21.1 In forward bulkhead. (Obligatory in Mk I only. Optional in + S)
- a Width of hatch opening. 1'8" +/- 1" (508 +/- 26);
 - b Depth of hatch opening. 1'0" +/- 1" (305 +/- 26)
- 21.2 In forward bulkhead. (Mk I A only)
- (a) Width of upper and lower hatch openings. 2'1 $\frac{1}{2}$ " +/- 1" (648 +/- 26)
 - (b)(i) Depth of upper hatch opening. 8 $\frac{1}{4}$ " +/- 1" (210 +/- 26)
 - (b)(ii) Depth of lower hatch opening. Maximum 10 $\frac{1}{4}$ " (261).
- 21.3 In forward bulkhead.
(Mk II and Mk II SD only). One or two circular inspection ports shall be fitted. Their openings shall be 5" +/- 1 $\frac{1}{4}$ " (127 +/- 32) in diameter and their centres shall be within 6" (153) of the upper edge of the bulkhead and within 8" (203) of the centreline.
(MK III only) One or two circular inspection ports shall be fitted. Their openings shall be 5" +/- 1 $\frac{1}{4}$ " (127 +/- 32) in diameter and their centres shall be within 10" (254) of the centreline and not less than 3" (76) from floor level.
- 21.4 In aft deck.
- (a) Width of opening. 2'0 $\frac{1}{2}$ " +/- 1 $\frac{1}{2}$ " (623 +/- 39)
 - (b) Length of opening. 1'1 $\frac{1}{2}$ " +/- 1 $\frac{3}{4}$ " (344 +/- 45)
 - (c) (Series 2 only). As alternative, a circular hatch, 5" +/- 1 $\frac{1}{4}$ " (127 +/- 32) in diameter, may be fitted.
- 21.5 In cockpit floor (Mark II SD only) one hatch of an approved type.
- (a) Width of hatch opening. 6 $\frac{1}{2}$ " +/- $\frac{1}{2}$ " (165 +/- 13)
 - (b) Length of hatch opening. 5" +/- $\frac{1}{2}$ " (127 +/- 13)



or

(c) 5 3/4" +/- 1/4" (146 +/- 32) in diameter.

21.6 *Hatch covers. Shall close the hatches in a watertight manner when secured by the hatch fasteners normally fitted to the boat.*

21.7 Forward hatch cover. (Mk. I and + S only)

(a) One circular watertight inspection port may be fitted in the forward bulkhead or its hatch cover, with its centre approximately on the vertical centreline of the hull and not more than 1'4" (407) from the underside of the deck. Its opening shall be 5" +/- 1/4" (127 +/- 32).

(b) The hatch cover may be permanently secured in a watertight manner, using additional fastenings. If so closed it shall be fitted with an inspection port as in Rule 21.7(a).

21.8 (Wayfarer World only). No more than 6 circular watertight inspection ports may be fitted to a maximum diameter of 6 1/4" (159).

21.9 (MK III only) In centreboard trunk. One circular watertight inspection port located on each side of the centreboard trunk. Each opening shall be 5" +/- 1/4" in diameter.

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22. THwarts AND BENCHES

22.1 Centre thwart. (Wood boats only). Height of upper surface above hog. 1'5" +/- 1" (432 +/- 26).

22.2 Side Benches.

a Shall be slatted, and in accordance with official drawings applying to specific version of boat;

b Overall plan width. 8" (204) minimum. (Wayfarer World excluded). (MK III only)
Overall plan width 7 1/2" (191) minimum;

c Thickness. 3/4" (19) minimum. (Wayfarer World excluded);

d Distance between inner edges of opposite side benches. 3'3" (991) maximum.
(Wayfarer World excluded);

e Forward side benches shall be fitted in position when racing. Aft side benches may be removed;

f (Wayfarer World only). Shall be from the official mould as specified in the approved drawings.

23. FLOORBOARDS (Wayfarer World and SD versions excluded).

23.1 Position. Shall be fitted when racing, but shall be removable.

23.2 Material. Shall be plywood or G.R.P. of minimum thickness 5/16" (8). Solid timber stiffening or framing permitted.

23.3 Number. Not more than three on each side of the centreline.

23.4 Weight. Shall total 30 lbs (13.6 kg) minimum.

23.5 Apertures. Finger holes, pump, drain and self bailer apertures may be located where reasonable.

23.6 Extent. Shall be substantially in accordance with official drawings applying to specific version of boat.

24. SHROUD PLATES

24.1 Distance from outside transom to centre of pin hole in each shroud plate. 9'0" (2743) maximum.

24.2 Distance athwartships between centres of pin holes in opposite shroud plates. 5'2" (1575) minimum.



HULL WEIGHT CONTROLS

25. HULL WEIGHT

25.1 Condition during weighing.

(a) All external and internal surfaces shall be dry, to the satisfaction of the measurer.

(b) No fitting shall be weighed with the hull unless it is securely bolted, screwed, bonded or otherwise fixed to the boat as permanent equipment to be carried when racing. Fittings not listed in 25.1(c) and (d) shall not be included in the measured weight.

(c) Items which shall be included during weighing:-

Centreboard.

Hatch covers.

Forward side benches.

Bow plate.

Centreboard pivot bolt.

Mast step.

Rudder hangings.

Sheet horse.

Shroud plates.

Stem band and keel band (see rules 11.4(e) and 12.8).

(d) Items permitted to be included during weighing:-

Inspection port covers.

Mast pivot pin.

Rigidly attached sheet fairleads.

Sheet cleats.

Rowlock sockets.

Drain sockets.

Not more than four lifting handles.

Bow fairlead.

Mooring and forestay cleats.

Two self-bailers.

Cleats or eyes for fastening covers or securing oars or anchor or motor.

Toe-straps with fittings.

Fendoff.

Fixed metalwork and fittings.

Clamps or turnbuttons for attaching side benches or floorboards or hatches.

(e) Items excluded from measured weight:-

Aft side benches.

Floorboards.

Detachable blocks.

Sheets.

Rudder.

Tiller.

Spars.

Supplementary bilge keels.

Bilge keel bands.

Additional main keel bands. (see Rules 11.4(e), 12.7 and 12.8).

25.2 Minimum weight. In condition specified in rule 25.1

(a) SD versions only. 402 lbs (182.3 kg)

(b) All other versions. 372 lbs (168.7 kg)



- 25.3 Weight correction. Hulls weighing less than that specified under 25.2 and in the condition specified in 25.1 shall be made up to the required minimum weight by weight correctors made of any material, but of total weight not exceeding 15 lbs (6.8 kg). Weight correctors shall be fastened to the underside of the centre thwart.
- 25.4 Reduction of weight correctors. Shall not be permitted without an official reweighing.
- 25.5 Record of weight correction. Weight correctors shall be weighed separately and their weight entered on the Measurement Form.
- 25.6 Change in weight. Any permitted alteration to the hull or fittings resulting in a change in weight shall require an official reweighing.

RIG CONTROLS

26. MAST

- 26.1 *Material. Shall be metal or wood.*
- 26.2 *Design of metal or wood masts. Shall comply with the official drawings. Heel may be tenoned.*
- 26.3 *Metal masts shall be made from extrusion weighing not less than 0.732 lbs/ft (1.089 kg/m).*
- 26.4 *Position of mast. Shall be determined by position of pivot holes in mast and kingposts, controlled by official drawings and Rule 26.5. The mast shall be secured by a bolt or pin of minimum diameter 1/4" (6) through the pivot holes and shall always be capable of being lowered without the removal of the pivot bolt or pin, or the adjustment, removal or disconnection of any mast restraining device attached to the hull at or below fore-deck level, other than kicking strap (boom vang) or halyards.*
- 26.5 Pivot holes in king posts. Shall be:-
- (a) *Centred 10'4½" +/- ½" (3163 +/- 13) from outside of transom.*
- (b) *Measured vertically below the sheer at the pin centreline 4½" +/- ½" (114 +/- 13). The sheer is the point at which the straight line projection of the outer surface of the hull intersects with the upper surface of the deck.*
- (c) *(MK III only) Centred 1'6" +/- ½" above level of cockpit floor.*
- (d) *Maximum diameter 5/8" (16).*
- 26.6 *Sail limit bands. Of distinctive colour, not less than ¼" (7) wide. Shall be marked on the mast as follows:-*
- (a) *Band No 1 with its upper edge 2'3½" +/- 1/8" (699 +/- 3) above the upper edge of pivot hole in mast. [See also note after 26.6(c)]*
- (b) *Band No 2 with its lower edge 16'2½" +/- ¼" (4941 +/- 7) above the upper edge of pivot hole in mast. [See also note after 26.6(c)]*
- (c) *Band No 3 with its lower edge not more than 19'3" (5868) above the upper edge of Band No 1 [See also note after 26.6(c)]*
- Note:** *Some masts are being manufactured with a pivot pin hole smaller than the original 16 mm. Masts with a smaller pivot pin hole SHALL and all masts MAY have the sail limit bands measured from the centre of the hole instead of the upper edge, in which case the measurement will be as follows:*
- (a) *Band No 1: 2'3.13/16" +/- 1/8" (707 +/- 3)*
- (b) *Band No 2: 16'2.13/16" +/- ¼" (4949 +/- 7)*
- 26.7 *Extended line of forestay and jib luff. Shall meet the mast below the lower edge of Band No 2 at a point not more than 75mm below the lower edge of this band.*
- 26.8 *Spinnaker halyard. Shall be suspended from a bearing point not more than 1½" (39) in any direction from the lower edge of Band No 2.*
- 26.9 *The height of the spreaders, at the centres of their roots, shall be 8'3¼" +/- 2" (2521 +/- 51) above the upper edge of the pivot hole in mast.*



27. BOOM

- 27.1 *Material. Shall be metal or wood.*
- 27.2 *Design of metal or wood booms. Shall comply with the official drawings, except that the boom wall forward of the sail limit band may have holes having a maximum aggregate area of 2 sq. ins (1290 sq. mm.) and aft of the sail limit band, some of the material may be cut away to accommodate a clew outhaul sheave.*
- 27.3 *Sail limit band No 4. Of distinctive colour not less than ¼" (7) wide. Shall be marked on the boom with its inner edge not more than 9'11" (3023) from the aft edge of the mast and track when in position on gooseneck.*
- 27.4 *Length overall including fittings. 10'5" +/- 1" (3175 +/- 26)*
- 27.5 *No fittings, devices or material may be added to the boom, the purpose or effect of which is to increase the stiffness of the boom section.*

28. SPINNAKER POLE AND/OR JIB STICK

Length overall. Shall not exceed 6'6" (1982)

29. RIGGING

- 29.1 *Standing rigging. Shall be a forestay and two shrouds. Shrouds shall be linked to the mast by one pair of spreaders which shall not be equipped with controls suitable for adjusting their angle or effective length while sailing. The forestay shall be capable of supporting the mast at all times when sailing.*
- 29.2 *Effective length of standing rigging. Alteration shall be prohibited after the preparatory signal of a race, except in the case of breakage or failure in any part of the standing rigging.*
- 29.3 *Jib tack position. The extended line of the luff of the jib shall meet the foredeck at a point not more than 1/2" (13) from its centre line and not more than 3.1/2" (89) from the extreme forward end of the hull, including fittings and stemband permitted by Rules 11.4 and 16.1(a).*
- 29.4 *Mainsheet. Shall not be taken to a centre mainsheet horse or track. It shall not use more than a single purchase tackle (or its equivalent power gain) between the boom and the hull at any position forward of the transom.*
- 29.5 *Kicking strap (boom vang). Shall not be attached to the boom at a point less than 6'11" (2109) from the inner edge of Band No. 4 (Rule 27.3)*

SAILS

30. SAIL CONSTRUCTION AND MARKINGS

- 30.1 *Sail material. Shall be of single ply woven fibre cloth. The body of the sail shall be capable of being folded flat in any direction without damaging the ply. The material shall be such that if torn it can be separated into fibres without leaving evidence of a film.*
- 30.2 *Unwoven transparent panels. One shall be permitted in any sail, but it shall be contained within a 2'7½" x 1'1¾" (800 x 350) rectangle. Except that a second transparent window shall be permitted in the mainsail near spreader height contained within a 22" x 12" (550 mm x 300 mm) rectangle. The longest side of the second panel shall be vertical. No part of any transparent panel shall be less than 6" (153) from any edge of a sail.*
- 30.3 *Cringles.*
(a) *Cringles, not exceeding 1¾" (45) in any dimension shall be fitted at tack, clew and head so that their centres lie not more than 2" (51) from the edge (including roping) of the sail at the corners.*



- (b) At a corner where there is more than one cringle within the cloth of the sail and complying with 29.3(a), the measurements shall be taken from the outermost.
- 30.4** Sailmaker's marks. Shall only be placed near the tack (or in the case of spinnakers, the foot) of the sail and shall not exceed 6" x 6" (153 x 153).
- 30.5** Emblem. Shall be shown on both sides of the mainsail. To be in accordance with the official drawings (a stylised W, with its wing trailing towards the leech of the mainsail). On white sails the class emblem shall be red, and on other coloured sails of contrasting colour to sail.
- 30.6** Sail numbers on mainsail. Shall be shown on both sides below the class emblem and above the upper of the two lower battens. The numbers shall be of contrasting colour to the sail and not less than 11 $\frac{3}{4}$ " (300) in height, nor 7.7/8" (200) in width (except for numeral 1) nor 1 $\frac{3}{4}$ " (45) in thickness.
- 30.7** Sail numbers on spinnaker. Shall be shown on both sides at approximately half height. The numbers shall be of contrasting colour to the sail and not less than 11 $\frac{3}{4}$ " (300) in height nor 7.7/8" (200) in width (except for numeral 1) nor 1 $\frac{3}{4}$ " (45) in thickness.
- 30.8** Other marks. Shall not be permitted within 3'0" (915) of the emblem and numbers specified in rules 30.5, 30.6, and 30.7.
- 30.9** Reinforcement at corners. Reinforcement of any fabric having the effect of stiffening the sail is permitted only in accordance with Rules 31.6, 32.7 and 33.8. Other reinforcement, as a continuation of corner stiffening or elsewhere, shall comply with the ISAF Measurement Instructions Section III.

SAIL DIMENSIONS AND THEIR MEASUREMENT

All sail measurements in rules 31, 32 and 33 shall be taken with the sail dry and laid on a flat surface with just sufficient tension to remove wrinkles across the line of measurement. Sail measurements involving cringles shall be taken from cringle centres.

31. MAINSAIL

- 31.1** Limits on spars. Shall be as follows:
- (a) At the tack. The projected upper edge of the boom at the gooseneck shall not extend below the upper edge of Band No 1 [Rule 26.6(a)].
- (b) At the head. No part of the mainsail shall extend above the lower edge of Band No 3 [Rule 26.6(c)].
- (c) At the clew. No part of the mainsail shall extend beyond the forward edge of Band No 4 (Rule 27.3).
- 31.2** Headboard width. Maximum 4" (102), measured at right angles to luff.
- 31.3** Leech length. Maximum 21'4" (6503) measured between centres of head and clew cringles.
- 31.4** Width measurements. Shall be taken under the following conditions:
- Half luff point. Shall be determined by folding the sail so that the centre of the head cringle lies directly over the centre of the tack cringle, with the two halves of the luff coinciding. The fold so formed indicates the half luff point and is marked on the sail.
- (b) Three-quarter luff point. Shall be determined by folding so that the centre of the head cringle lies directly over the mark made at half luff point [31.4(a)]. The fold indicates three-quarter luff point and is marked on the sail.
- (c) Half leech point. Shall be determined by folding so that the centre of the head cringle lies directly over the centre of the clew cringle. The fold so formed indicates the half leech point and is marked on the sail.
- (d) Three-quarter leech point. Shall be determined by folding so that the centre of the head cringle lies directly over the mark made at half leech point [31.4(c)]. The fold indicates three-



quarter leech point and is marked on the sail.

(e) Width measurements. Shall be taken between luff and leech measurement points, over the full width of the sail, including roping, and any hollows in the leech shall be bridged by straight lines.

(f) Width at half height. 6'7" (2007) maximum.

(g) Width at three-quarter height. 3'9" (1143) maximum.

31.5 Battens. Shall be permitted as follows:

- a Not more than four
- b Shall divide the leech into approximately equal parts;
- c Length of top batten. 2'0" (610) maximum;
- d Length of battens other than top. 2'6" (762) maximum;
- e Width of battens. 2" (51) maximum.

31.6 Stiffening at corners. Shall be of woven fabric. Shall not extend more than 1'0.7/8" (327) from the centres of outermost corner cringles.

31.7 Sail Head Buoyancy. Shall be permitted as follows:

- a A patch may be sewn onto one side of the sail to form an openable self-draining pocket for buoyancy material. It may extend for a maximum of 3'0" (915mm) from the centre of the head cringle;
- b Nothing inserted into the pocket shall have the effect of extending the leech;
- c Nothing shall be inserted into the pocket other than buoyancy material.

31.8 Loose footed mainsails are prohibited. The mainsail shall be fitted with a bolt rope along the foot from no more than 12" (305) from the tack to no more than 3" (76) from the clew. A slug slide may be fitted at the clew cringle. The bolt rope shall be contained within the groove in the boom whilst racing. The tack of the mainsail shall be secured by a pin through the tack fitting on the boom and the tack cringle on the sail.

32. JIBS

32.1 The jib shall be a three cornered sail. A convex curve is permitted in the foot but not in the leech. The luff of the sail shall not enclose the forestay.

32.2 Luff length. Maximum 13'6" (4115) measured between centres of head and tack cringles.

32.3 Foot length. Maximum 7'2" (2198) measured between centres of tack and clew cringles.

32.4 Leech length. Maximum 13'0" (3963) measured between centres of head and clew cringles.

32.5 Foot depth. Maximum 13'4" (4064) measured from centre of head cringle to mid point on the foot. Mid point of the foot shall be found by folding so that the centre of tack cringle lies directly over the centre of clew cringle.

32.6 Battens. Prohibited.

32.7 Stiffening at corners. Shall be of woven fabric. Shall not extend more than 10¾" (273) from the centres of corner cringles.

33. SPINNAKER

33.1 Shape. Shall be three cornered and symmetrical about a centreline which joins the centre of the head cringle to the midpoint of the foot.

33.2 Measurement conditions. For the purposes of 33.3, 33.4 and 33.5, the sail shall be folded in half about its vertical centreline, with both halves coinciding.

33.3 Length. Maximum 15'6" (4725) from centre of head cringle to any part of the foot.

33.4 Width measurement points on the luffs and centrefold. Each shall be determined by measurement in a straight line 7'1.1/2" (2172) from the centre of the head cringle.



- 33.5 Width measurements. Between the points determined in Rule 33.4. Maximum 5'6" (1677) Minimum 5'2" (1575).
- 33.6 Head Shape. Points shall be marked on the luffs at 5.1/8" (130) measured in a straight line from the centre of the head cringle, with the sail unfolded. Maximum distance between these points measured over the surface of the sail shall be 9.7/8" (251).
- 33.7 Foot. Measured (unfolded) between centres of clew and tack cringles. Maximum 11'0" (3353).
- 33.8 Stiffening. Stiffening shall be of woven fabric. Shall not extend more than 11.5/8" (296) from the centres of the head, tack, clew or downhaul cringles.

SECTION IV - GENERAL

34. BUOYANCY

- 34.1 Buoyancy compartments. *Shall be of watertight construction.* (Wayfarer World only). The buoyancy shall be in three separate airtight compartments as follows:
 - a Floor bearer support structure;
 - b Forward buoyancy compartment;
 - c Remainder of boat.
- 34.2 Holes or openings into the buoyancy compartments. Shall not be permitted except as specified in Rules 15.5 and 20.
- 34.3 Compartments. *Hatch covers shall be secured in position and drain holes effectively stoppered when racing.*
- 34.4 Positive buoyancy units of closed cell plastics foam. Shall be securely fixed within the hull of G.R.P. and composite boats, as follows (lift refers to buoyancy when submerged in fresh water):
 - a (MK I and MK I A only) One unit providing not less than 180 lbs (81.65 kg) lift in the forward compartment. Not more than two units providing not less than 90 lbs (40.82 kg) total lift in the aft compartment;
 - b [Mk II (except SD versions)]. One unit providing not less than 90 lbs (40.82 kg) lift in the forward compartment. Units providing a total lift of not less than 90 lbs (40.82 kg) under each side deck, aft of the main shrouds;
 - c Alternative for MK I A and MK II (except SD versions). One unit providing not less than 90 lbs (40.82kg) lift in the forward compartment. Units providing a total of not less than 30 lbs (13.6 kg) beneath each side deck and two units providing a total of not less than 120 lbs (54.42 kg) lift in the aft compartment. The units shall be positioned according to the official drawing;
 - d (Mark II SD and Mk III). Not more than two units providing not less than 150 lbs (68.04 kg) lift in the forward buoyancy area. Not more than two units providing not less than 120 lbs (54.42 kg) lift in the aft compartment;
 - e (+S). Not more than two units providing not less than 50lbs (22.7kg) lift in the forward compartment. Not more than two units providing not less than 50 lbs (22.7 kg) lift in the aft compartment;
 - f (Wayfarer World). Two (2) no. 20 litre plastic cubitainers in forward buoyancy compartment and eight (8) no. 5 litre cubitainers located either side of the centreboard case under the floor.
- 34.5 Buoyancy test. Shall be conducted according to Rule 34.7 or 34.8.
- 34.6 Buoyancy equipment in excess of that specified in Rules 34.1 and 34.4 shall be permitted, but shall be removed before carrying out the alternative wet buoyancy test in Rule 34.8.
- 34.7 Dry Buoyancy Test. (Alternative to 34.8). Shall be conducted as follows:



- a Hatches shall be closed normally, using only the boat's own hatch covers and fasteners;
- b Drainage holes from buoyancy compartments shall be closed with their normal stoppers, except where tubes to a pressure/vacuum source and gauge are connected;
- c Equipment for producing and assessing pressure differentials between the buoyancy compartment and surrounding atmosphere, and including a U-tube water gauge, shall be connected to the compartment;
- d Super-atmospheric or sub-atmospheric pressure shall be applied to the compartment, sufficient to produce a differential reading of at least 5" (127) on the water gauge;
- e After isolating the buoyancy compartment from the vacuum or pressure source, the pressure differential specified in 34.7(d) above shall not reduce from 5" (127) to 2" (51) in less than 30 seconds.

34.8 Wet Buoyancy Tests (Except for SD versions and Wayfarer World. Alternative to 34.7). Shall be conducted as follows:

- a Buoyancy compartment joints, hatch gaskets and hatch fasteners. Shall be inspected by the buoyancy tester for efficiency;
- b Hatches shall be closed normally, using only the boat's own hatch covers and fasteners;
- c Drainage holes from buoyancy compartments shall be closed with their normal stoppers;
- d Excess buoyancy equipment permitted under Rule 34.6 shall be removed;
- e The boat shall be floated on its beam ends with the masthead touching the water. A load of at least 250 lbs (113.4 kg) shall be applied vertically to the hull (the weight of two persons can conveniently provide this load). After a minimum of 5 minutes in this condition with one gunwale submerged, the test shall be repeated for a minimum of 5 minutes with the other gunwale submerged;
- f The boat shall be floated upright in a waterlogged condition, with water overflowing the top of the centreboard case, immediately after the test in 34.8(e). It shall remain in this condition for a minimum of 10 minutes, then be emptied;
- g The buoyancy compartments shall be inspected for significant leakage immediately after completion of 34.8(f). There shall be no more than 1.1/2 gallons (6.8 litres) in the aft buoyancy compartment. The leakage totalled over all compartments comprising the bow buoyancy compartment shall be no more than 1.1/2 gallons (6.8 litres).

35. SPECIAL PROHIBITIONS

- 35.1** Ballast. Whether attached to boat or carried by crew. Prohibited.
- 35.2** Trapeze or any apparatus or contrivance extending outboard from the hull, spars or rigging and attached to the crew, the purpose or effect of which is, or may be, to support or assist in supporting a member of the crew, outboard or partially outboard. Prohibited.
- 35.3** Electrically operated instruments or mechanisms. All electrical or electronic devices or instruments are prohibited except for watches, compasses and equipment for the recording of sound or pictures, unless otherwise permitted or required by the Sailing Instructions.
- 35.4** Spinnaker Chutes. Permitted as detailed in the official drawings and specifications.
- 35.5** When racing, not more than one spinnaker shall be on board.
- 35.6** When racing, the drain tubes permitted under Rules 15.7 shall be sealed in a watertight manner. Use of the drain tubes prohibited when racing.



35.7 Devices to adjust the position of the mast at deck level, for example mast rams, levers, wedges or purchases, are prohibited. Parallel mast chocks are allowed.

36. CLASS NUMBER

Numbers shall be permanently displayed on the official license plate fixed to the forward face of the aft bulkhead or on the centreboard case capping immediately aft of the main thwart. Height of figures 1/8" (3) minimum. On wood boats the numbers shall also be carved on forward exposed face of transom beam. Height of figures 1" (26) minimum.

37. CREW

The boat shall be raced by not less than two persons except in single-handed events.

38. CLASS SIGNAL

International Code Flag "I" is recommended. Not obligatory.

Effective April 2000





Annex 2 Adresses

Websites

Website UKWA,

<http://www.wayfarer.org.uk/index.shtml/>

webmaster Richard Readings, readings@pobox.com

Website CWA

<http://www.angelfire.com/de/whiffle/>

webmaster Al Schönborn, uncle-al@home.com

Wayfarer Institute of Technology

<http://www.angelfire.com/de2/WIT/>

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