the Soling Manual

International Soling Association

FOREWORD

The Godfather of this book is Heike Blok, whose original intention was to provide the Class with a Tuning Manual.

However it now goes much further than Tuning and contains a wide variety of subject matter covering such diverse areas as jibing, broaching (or not broaching!), big fleet strategy, and safety.

The contributors are, without exception, sailors of very great experience who are willing to share this experience with Soling enthusiasts who may be beginners in the Class, or already climbing the ladder of success.

Almost all of the articles appeared in *Soling Sailing* or *Leading Edge,* the journal of the US Soling Association. But it should be understood that the articles are all directed at Soling owners who are assumed to have had considerable knowledge of sailing in other boats before graduating to our Class. We are not aiming to instruct complete beginners.

The ISA Committee are most grateful in particular to Heike Blok for being the inspiration for this Manual, and to all the contributors who have allowed their work to be used in this way. It is hoped that the Manual will be an invaluable aid to better Soling sailing for many years to come.

First Edition, August 1988.
Second Edition, April 1992.

CONTENTS

INTRODUCTION

HOW TO BECOME A SOLING OWNER AND ENJOY IT

by HEIKE BLOK

Probably the best way to become a Soling owner for the first time is to buy a second hand boat. Your National Secretary will almost certainly have some details of boats available, and you will use the skills and knowledge which you have gained in other classes before graduating to a Soling to judge the condition and value of these.

But if like me, you may perhaps decide to buy a new boat direct from the builder, the Class is fortunate in having a number of high quality licensed builders who are listed in the Soling Guide also available from your National Secretary. It happens that I myself have used boats built by Abbott, of Canada, and if I refer to this one builder it does not imply any special superiority, but merely personal choice.

I have, in fact, just ordered a new Soling - my sixth. It's a great feeling to order a new boat. It somehow happens, like a new romance . . . but cheaper. It's not like buying a car. Maybe like buying a nice painting. I know now that the object of my excitement is not going to fulfil my dreams (like with the romance). I also know that I must not try to oversee the consequences of starting again with a new boat. I mean the real consequences, like all the wet and cold you will again be most likely exposed to, all the criticism you will have to endure after you wanted to be in all corners of the race course at once, all those thousands of kilometres of driving towards that one supposedly heavenly place where you are going to get all those laurels. The way back, after you did not get them (with a hole in your boat?). Once I told Bertrand Cheret, the famous French helmsman and sailmaker, that, if I would be sent to hell, I would have to pack my boat and sails in the rain every day. He then added: "and drive (home) a thousand kilometres!"

This was going to be a booklet to entice you .... But you see, I know that before reading this you must have already reached the point of no return in dreaming and so, I'll better help you make the best of it, as well as I can. And so, let's keep this practical - just because we are dreamers. Yes, I said we. You can't be all that different!

Let's start the circle

Let's start the circle after you decided to want to sail an Olympic class and close it, after you're ripe for a new boat and want to sell your old one.

Once you feel the wish (urge) to sail Olympic you must realise that you are pretty ambitious. You want to win man! Winning, however, is not easy in an Olympic class. There are some more guys out there who nurse the same feeling and probably have the same good background in sailing as you. If you want to go for the metal you must find two more guys with the same ideas and by sheer perseverance, mold the three of you into a powerful, smooth running machine, pulling all the right ropes at the right time. The boat to do it in, in a most exciting and ideal way is, of course the Soling! It is:

- very exciting to sail in all winds!
- easy to rig (and put away on the trailer);
- easy to tow, although in some European countries you need a car with a weight equal to the total weight you're towing;
- a very "honest" boat. A strict one design class with a very good class organisation;
- it is sailed with a limited number of sail types. One main for all conditions and you take two jibs on the water;
- it's long lasting;
- very little homework on fittings and rigging;
- very easy to tour with.

The builder

Apart from the fact that we want quality, I like to have some personal relationship with the builder as I feel that he is making a very personal thing for me, a thing I will have to live many emotions in and a thing I want to be proud of. ("Can I come aboard and look at your ....").

HOW TO BECOME A SOLING OWNER AND ENJOY IT – continued

Heike Blok

It helps very much to have a builder who sails the boat himself. He will understand all the above and will be able to help you much better with the lay out.

The lay out

Paul Elvstrom, Buddy Melges and Bill Abbott have done most of the development for the Soling class and that is why we have now a very mature one design boat with everything working as it should.

There are many ways to play a tune and that goes for arranging your working room in and on your Soling too. Let me mention a few (working) principles and possibilities as in the end you'll have to make up your own mind anyway on this very important issue.

Buddy Melges once told me (he told me many things!). "If you can't do it right away, with a minimum effort, it's wrong. It's got to *work* and if it does not, the boat will sail you instead of you the boat!"

Everything *must* work and smoothly at that. That's one very important principle.

Don't overdo it; simple is almost always good,

- you must decide whether to have all the controls at your (the helmsman's) fingertips, or to let the guy up front handle some. (For instance, the jib halyard, the jib foot and the main Cunningham.)
- is my crew going to want hiking straps or bars with anklets?
- who is going to hoist the spinnaker?

Those are some important points the solution of which can be found by talking (and asking!) your competitor-friends and this is also an excellent exercise in keeping our sport "gallant"!

Once you get the boat going, don't start changing the layout too soon. Exercise will make you get a certain "feel" of the boat and you'll get used to the layout. Having different crews does complicate a lot of things, however.

At the hoist (or how to avoid a disaster)

The hoist is unavoidable and we depend very much on it to get into the water. Now, there are hoists and hoists! Fully automatic, hand driven, tall, short, new, old, mobile, well—the lot! Before delivering your precious boat into the hands of the crane driver, you must ascertain that:

- The crane is capable of lifting 1500 kg;
- Will not topple (mobile cranes!!);
- Has a good-looking cable;
- It will turn rather smoothly;
- The water is deep enough for your draught (you need 1.50 m).

Furthermore, it is *your responsibility* to ascertain that your boat is *ready* to be lifted either with the mast laid or standing up, depending on the type of crane. If the mast is up then you must take away the back stay but not before you have supported the mast with your spinnaker pole. (One end in the pole ring, the other on the deck - with the pole downhaul tensioned and cleated.) The mast should tilt slightly forward but without the support of the spinnaker pole the mast would fall forward!

- Your hoisting cables are 100 per cent;
- They are not twisted at their fastening eyes;
- They are supported sideways with rope to prevent the boat from heeling in the air;
- Your mooring ropes are in position and hanging down;
- You have one man at the tip of your keel to prevent it from hitting your trailer. (It'll save you so much work!).

REMEMBER, A BOAT FALLING OFF A CRANE CAN DESTROY LIVES!

Maintenance

Fresh water and a sponge do most of your maintenance work. If your hull had a speed rubdown job the hull looks like

HOW TO BECOME A SOLING OWNER AND ENJOY IT – continued

polish the hull with a quality brand of silicone wax (Hempel) to preserve the resin in the fibreglass of your hull . It will also make the hull less adhesive for dirt in the water. (Oil!) If you must leave your Soling in the water for longer periods of time you need a good anti-fouling which does not necessarily slow down the boat. (Teflon with bronze!).

Use a large cover overnight and as you're waiting for wind. The sun rays are bad for your fibreglass deck, especially if you have a coloured deck. A total cover when trailering will keep your boat clean on the inside and enables you to carry luggage and stuff in the boat. After 7, 8, 9, even 10 years, your boat will still look handsome and you will then be able to have it fulfil its promise of a high resale value but, as I indicated, you must help her a bit. Also, in the meantime, you'll enjoy your Soling so much more and you will find out what a terrific Olympic class the Soling is!

This closes the circle and after doing it once, I'll bet you'll be back for another "circle" and in the process make a lot of friends!

Schindellegi, Switzerland. **Heike Blok**

GENERAL

THE INTERNATIONAL SOLING CLASS

by STU WALKER

Jan Linge designed and built the first Soling in 1964. Three years later in the second of two trials, its remarkable range of performance, easily controllable in a gale, responsive in a drifter, resulted in its selection as the IYRU's Three-Man Keelboat. Sixty boats were built in 1967, 300 in 1968, and, with the impetus of Olympic selection, another 1600 in 40 countries between 1968 and 1972. Buddy Melges and Paul Elvstrom, the dominant figures in the early years of the Class, met at Kiel in the '72 Olympic Games and Melges won the Gold Medal.

As the intensity of competition and the standard of performance increased, the large number of local fleets which characterized the Class in the '70's gradually gave way to concentrations in major yachting centres. However, the efforts of the top sailors to support the newcomers maintained a relative homogeneity and the Class became known for its singular success in mixing all levels of competence in its many regattas. With a single mainsail and shrouds mounted on tracks, sailors of all ages - from 16 to 60 - and weights from 70 to 90 Kgs (average all up crew weight 255 Kgs) compete successfully. A new surge of boat construction from three very active builders has resulted from the recent opportunities for sponsorship.

Today in Europe Olympic aspirants participate in a year-round circuit of twenty major regattas and from April to October European Lake sailors travel from country to country competing in regional regattas almost every weekend. In North America and Australia several major regattas each year draw boats from opposite coasts together, but club racing is typical. Solings are also sailed in many Asian countries and in the larger countries of South America. The Olympic Regatta attracts entries from 22 to 25 different nations.

Match racing was introduced to the Class with the donation of the Ken Berkeley Cup in 1979. Since then interest has steadily increased and, with the announcement of the new Olympic match racing format, Soling match racing regattas are being conducted in North and South America, Europe, Asia, and Australia. The majority of the world's ranked match racers are present or former Soling sailors.

The most important advance in the management of the Soling in the past decade (perhaps since its design) has been the attachment of the shrouds to cars mounted on tracks to facilitate use of the fixed spreader rig. This innovation permits the use of but one mainsail in all conditions (without reefing) and facilitates the adaptation of which ever of the two permitted jibs is in use to a wide range of wind velocities and waves. The purpose of the shroud adjustment is to maintain jibstay sag within the range appropriate to the jib without altering mast bend beyond the range appropriate to the mainsail.

In light air this requires "pre-bend" - the induction of jibstay sag and modest mast bend (the amount for which the mainsail was designed) with or without only minimal backstay tension. A light air jib such as the North V-1 needs 4"-6" of jibstay sag to properly distribute the draft while modern mainsails require only 1½"-2" of mast bend. By pushing the upper shroud cars to the forward legal limit the spreader tips and the mast at their level are forced forward, bending the mast about two inches (without backstay tension). The resultant shortening of the mast column eases the jibstay into a 4"-6" sag with minimal wind pressure. In the lower wind ranges variations in mainsheet tension are sufficient to keep the jibstay from excess sag and from 6-8 knots a little backstay tension can be added without excessively bending the mast. At some increased wind velocity (usually between 3 and 8 knots) the shroud cars must be moved aft (to a position midway between full forward and mid-mast) - sooner in waves, later in smooth water.

In light air to windward jib shape is the most important determinant of success and is achieved primarily by control of jibstay sag, the jib trimmer calling for more or less and the main trimmer responding with more or less mainsheet and backstay tension. When these adjustments are insufficient (without adversely affecting mainsail shape) to control the jibstay sag, the shroud cars are moved aft. The attachment of the sheet to the clewboard and the position of the luff of the

THE INTERNATIONAL SOLING CLASS – continued

jib on the jibstay are based upon the response of the telltales, up and down the luff, responding simultaneously to variations in heading (erring toward the lower telltales reacting first - the bottom of the jib slightly flatter than the top). It is best to use a clew hole in moderate air that permits the tack to be an inch or so above the deck so that sheeting angle adjustments can be made by moving the jib luff down the stay if the wind velocity increases (and up the stay if it decreases) without changing the clew hole. (All modern boats have multi-part controls of tack downhaul and halyard (uphaul) led to each rail for easy adjustment - as well as jib traveller and a fine jibsheet adjustment.)

The jib should always be twisted - more in light air and in waves. The chord of the foot, with the centre of the traveller car set between 11 ½" and 14" from the centreline, should be 10°-15° inside of the position of the upper batten. A telltale attached to the leech at the latter position should (according to Dave Curtis) "never, never, never stall". A window in the mainsail is usually provided through which this telltale can be observed. "When in doubt, let it out (the jib sheet)". The resistance of the jib leech to stalling is improved by using clew holes farther forward or displacing the sail down the jibstay, i.e., by increasing its twist.

In light to moderate air to windward the mainsail should be set on a mast that sags to leeward (achieved by slack lower shrouds). With only the amount of fore and aft bend (2"?) for which the sail was designed. If the jibstay sags or pumps excessively despite sufficient mainsheet and backstay tension to bend the mast more than 2", the responses should be, first, to bring the shroud cars aft and, second, to increase the lower shroud tension. The concept of the "Kostecki Wobble" is that some (but very little) jibstay pumping is desirable, i.e., trim to just, but no more than just, eliminate it. With the jibstay controlled the mainsheet/traveller couple should be adjusted to bring the boom to the centreline (or in ideal conditions slightly to windward of it) and to keep a telltale on the leech at the upper batten just flowing. This telltale is almost as critical as that on the upper jib leech. Only in optimal moderate air, smooth water conditions when the boat is up to speed should it be completely stalled; when slowed by tacking, dirty air, waves, etc., it must be flowing. The outhaul should usually be trimmed hard to prevent the lower leech from hooking (particularly in light air), and the Cunningham left without tension until the boat is overpowered.

In heavy air to windward the shroud tracks are used primarily to reduce jibstay sag by stiffening the mast. By pulling the upper shroud cars aft the spreader tips are moved aft preventing the midmast from bending forward. At the same time lateral mast sag is eliminated by tensioning the lower shrouds and/or pulling their cars aft. Above 18-20 knots the most important adjustment is the tensioning of the lower shrouds above the tension of the uppers (upper tension 600-800 pounds) and pulling them full aft (to a tension much greater than the uppers). The result is that the top of the mast falls to leeward, eases the upper mainsail leech, and permits the mainsail to be set with its lower portion on the centreline (for pointing) and its upper portion twisted off 20° or more to reduce heeling and improve balance.

In heavy air the jibstay will always sag more than is desired so that all shroud cars should usually be full aft and the backstay tensioned to both flatten the main and control the jibstay. It is possible to move the shroud cars too far aft, however, resulting in a tight jibstay but too full a mainsail and possible to use too much backstay, resulting in too flat a mainsail and, through excessive mast bend, an eased jibstay. The jib tack should be trimmed down to the deck and, if necessary, the sheet attached at a hole farther forward to facilitate twist. If the boat is not driving through the waves, lays over and wallows when a gust hits, the most important adjustment is to ease the jibsheet. The jib top should be more open, the upper telltale even more resistant to stalling. The traveller car should be eased slightly and eased farther in gusts.

The mainsail should be flattened through the tip fall-off discussed above and through fore and aft mast bend of 7"-8" induced by backstay tension. The boom can be carried close to centreline with adjustments for gusts in smooth water made by (slightly) easing the traveller and heading up and in waves by tensioning the backstay. The mainsheet should be close to two-blocked. The usual rake (approximately 29" - measured by the amount that the jibstay length (when under tension to windward) exceeds the hounds to deck mast length) should be decreased if necessary (though usually not) to permit adequate mainsheet tension. The lowers should be tensioned and the sheet eased until the boat seems lively, shoots ahead, rather than wallowing, in gusts. The outhaul should be full out and the Cunningham tensioned only enough for balance - usually some horizontal wrinkles persist even in heavy air. The mainsail may luff in a smooth inward bulge, but should never slat or flog. The vang should be tensioned, if necessary, to flatten the lower portion of the main and stop the mast from pumping. If the mainsail continues to flog, the jibsheet will need to be eased and the jib traveller dropped until the jib leech conforms to the mainsail's leeward bulge and the flogging stops.

The control of jibstay sag/mast bend is influenced by the tension in the shrouds, the angles, both horizontal and vertical, which the shroud tracks make with the mast, by the length (optimal forward movement is limited by Class Rule, aft not significantly affected) of the tracks, by the position of the spreaders in the mast, by the angle of the spreaders to the mast, by the position of the shrouds in the spreader tips. The usual arrangement is to have the tracks parallel to the centreline, at a slope perpendicular to the mast rake, and with the spreaders perpendicular to and in the middle of the mast. However, increased pre-bend, optimal for light air, smooth

THE INTERNATIONAL SOLING CLASS – continued

water sailing, can be achieved by high upper shroud tension, slack lowers, upper shroud tracks with minimal rise forward (or toeing out), and spreaders set (or swept) back in the mast or shrouds set back in the spreader tips. Increased stiffening, optimal for heavy air and waves, can be achieved by moderate upper and high lower shroud tension, upper shroud tracks with increased rise forward and/or toeing in, and spreaders set (or swept) forward in the mast or shrouds set forward in the spreader tips.

Offwind speed is primarily dependent upon good crew work particularly by good spinnaker sheet control. On the reach many (but not all) have the middle man control the sheet and the foredeck man control the guy which comes forward above him. By pumping the guy the foredeck man can aid the initiation of surfing (not more than twice per wave) and prevent broaching (for which purpose unlimited pumping is permitted). The guy should never allow the pole to be less than one foot off the jibstay (which sags to leeward). When the pole is farther forward the spinnaker becomes too full and in strong winds the boat goes slower and makes more leeway. When reaching the pole should (except in very light air) always be fully elevated (to the upper ring or to the upper legal limit) but should not be angled more than 15° above the horizontal as this diminishes the sail's projected area and, in heavy air, shifts the draft aft to increase heeling and windward yawing. (And in very strong winds makes the sail more difficult to manage.) Except in very strong winds - above twenty-five knots - even on tight reaches the large spinnaker can be carried by an experienced crew. (The small spinnaker is now limited to use in very strong winds on tight reaches particularly in crowded conditions and in very light air downwind when it permits the boat to make a net gain by sailing lower). When the first reach becomes too tight standard practice is to set the big spinnaker and ride fast as far down the leg as possible. Then on the mark approach (with sheet and guy tightly trimmed) the spinnaker halyard is eased to permit the sail to float out ahead and to leeward while the boat is brought back on course. The halyard is rehoisted just before the jibe.

Some have the spinnaker halyard led aft for the helmsman to hoist - most at the mast base for the forward crew to hoist immediately after he throws up the spinnaker roll (packed neatly for easy opening). In the latter case the helmsman pulls the guy aft rapidly and the middle man takes the sheet. In strong winds it is essential that as the spinnaker is trimmed, the crew (at least the big one), hop over the rail into a full hike, the vang is released (or in hand for release), and the foredeck man pumps the guy for that first important wave. Thereafter, the boat is hiked sufficiently to keep it "on its feet", the spinnaker man keeps the luff folding (at least a foot) to assure that the spinnaker is facing as far forward as possible, the foredeck man pumps the guy as necessary, and the vang is played to maintain the optimal angle of heel (in, if the crew are dragging, out, if the crew are not!). Keeping the boat bolt upright (with the main ragging completely, if necessary) is essential to proper wave riding - which in strong winds is the determinant of reaching success.

Reach to reach jibing is the most difficult manoeuvre in the Soling - and even the best periodically fail - particularly in a crowd. In light air it is essential to move the spinnaker across the bow of the turning boat at a speed greater than the turn - as the apparent wind shifts rapidly. In heavy air the keys are to keep the spinnaker choked - the old guy trimmed full aft (and in very strong winds, cleated), with the old sheet minimally eased, and for the new guy to be held down by the tight sheet, the middle man's hand, or best, by a tightened twing line - so that the foredeck man can reach it easily (after taking the pole completely off the spinnaker). The foredeck man should attach the pole to the new guy and with his outboard hand slam the pole forward against the tack. This manoeuvre brings the inner end of the pole up into position so that in coordination with the easing of the previously tight (in very heavy air, cleated) guy, it can be easily reattached to the mast. In very heavy air a wide gradual swing, even giving up a couple of boat lengths in order to be outside, with both sheets cleated, the spinnaker choked, the middle man only needing to bring the boom across, and the helmsman only needing to steer, down slowly to the jibing point, briefly back against the swinging of the boom, and then gradually up to the new course, will pay large dividends.

Downwind the boat must be balanced - free of rudder drag. To avoid the usual windward yawing moment this means releasing the backstay and pulling (with the jibstay) the mast 2'-3' forward of vertical, heeling the boat slightly to windward, pushing the bow down by moving crew weight forward (in light to moderate air putting one crew on the foredeck), and keeping the spinnaker shifted to windward of the centreline (to the extent possible). The spinnaker is the important sail (unless the jib is pulling significantly it is best dropped); the mainsail needs only to have sufficient vanging to remove twist and be displaced so that most of it is approximately perpendicular to the apparent wind. On broad reaches the boom should be brought inboard until the leech telltales begin to flow as any aerodynamic lift is valuable.

The spinnaker should always be set so that the maximum area is exposed to windward of the centreline - out from under the mainsail. The pole should always be carried as far back as possible without flattening the spinnaker foot excessively - without pulling it against the jibstay. It should also be carried as low as possible so that the spinnaker moves to windward with its centre seam vertical. The sheet must always be maximally eased, the luff always breaking - the bigger the break the better as it means more of the sail is to windward and less of it is driving the boat into the wind. In light air the helmsman may take the guy and nurse it back as he bears away in the puffs, ease it forward as he goes up in the lulls. In moderate to strong air it is better to keep the guy fixed (as that transmits the force of the sail directly to the boat) and the course changes can be read as indicators for jibing to the more directly downwind jibe. The top of the spinnaker is creating lift from the overflow and in moderate air, to improve the angle of the sail's upper surface, the halyard may need easing.

The Soling must be tacked downwind at fairly high angles. Up to 15° to the dead downwind course there is no significant increase in distance sailed so it is rarely desirable to sail closer than 15° to that course (always up in the lulls, down in the gusts). In light air it is essential to keep the spinnaker pulling, to sail (with the pole down sufficiently) as high as is necessary to keep it so, to avoid the luff sagging into a J-shape. In very light air the little (mini) spinnaker may be useful downwind. Its small area permits it to lift at a lower sailing angle than the big sail and, if the sailing angle required to keep the big one full is more than 30° to the dead downwind direction resulting in a large increase in distance sailed, the mini will provide net gains. On reaches even in the lightest air the big sail will usually function - but if the mark cannot be laid without a jibe consider the mini.

SHROUD TRACKS

by DAVE CURTIS

When I started my campaign for the '84 Olympics it was readily apparent that race conditions on any one day could be anywhere from 8-20 knots. Since almost all Soling sail inventories change from light designs to the heavy designs in that range I felt it would be a tremendous advantage to sail through that range with one sail.

Obviously the only way we could accomplish this was to gain more control over the rig. Enter the shroud tracks. Shroud tracks are not new to the Soling class. In the early 70's many Solings were equipped with tracks for either uppers or lowers or both. Some people even used a separate track for each shroud. But the engineering was wrong and therefore the real advantage was not found. By ramping the tracks at precisely the right angle the shrouds can be moved forward or aft and not change the tension. Even though my tracks have only 8 inches of fore and aft travel we gain a significant amount of control of mast bend and forestay sag. Heretofore, that was only possible by backstay, mainsheet and vang adjustments. By using ball bearing cars it was always possible to move the shrouds back and forth in any breeze; the weather one even while hiked.

For those who might be sceptical about learning how to use the tracks it is really quite simple. Forward in light, middle in medium and aft for heavy air. In general if you need power in the jib move them forward, if you want less sag and a flatter jib, move them aft.

One of the major advantages of shroud tracks is the elimination of the constant tension adjustments to the upper and lower shrouds. Tracks also eliminate the need to change the spreader angle for different conditions.

Obviously I'm in favour of keeping the rules as they are. Although not cleaner, the tracks do allow simpler tuning, and altogether eliminate the need for two mainsails.

SHROUD TRACKS

by STU WALKER

As we attempt to match shroud track performance to our sails and masts in varying conditions of wind and sea, we acquire a better understanding of the factors which determine their effect - and meet a few surprises! The use of shroud track cars permits jibstay tension to be (at least partially) divorced from backstay tension and mast bend. Without them, whenever backstay tension is increased, jibstay tension is also increased (though not linearly) and vice versa. With them forward (pre-bend) in light air, it is possible to bend the mast (so as to accommodate the mainsail luff curve) without tensioning the jibstay (so as to accommodate the jib luff curve and keep the jib full). With them aft in heavy air, it is possible to tighten the jibstay without excessively tensioning the backstay and bending the mast. In order to maximise this independence, to obtain more pre-bend and jibstay sag in light air and more mast

SHROUD TRACKS – continued

stiffness and jibstay tension in heavy air, we must recognise the following influences:

1. Backstay Tension - with no backstay tension, forward movement of the shroud cars merely rakes the mast forward. With shroud cars abreast the middle of the mast, one must determine - and mark the backstay - at the tension needed to bring the mast back to its intended rake without bending the mast - i.e., while sighting up the mast, pull on the backstay until (and stop pulling when) the mast just begins to bend. This tension becomes the zero mark on the backstay. Moving the shroud cars all the way forward (without changing the backstay) shows how much pre-bend is attainable (at least 5 cm - depth of cord - should be possible).

2. Upper Shroud Tension — if the uppers are loose, no pre-bend (or mast stiffening) results from movement of the shroud cars. The converse is also true: if upper shroud tension is high, pre-bend and mast stiffening are attainable—the higher the tension, the more effect a given amount of shroud car movement produces. If the upper shrouds are at a tension of 800-900 pounds (400 kilos), pre-bend (with the cars in the forward position) and mast stiffness (with the cars in the aft position) will be maximised.

3. Rake - the effect of rake is relative to the vertical "ramp angle" of the shroud car track, but for any given "ramp angle", more aft rake will increase the effect of shroud car movement forward and decrease the effect of shroud car movement aft - and visa versa.

4. Mast Stiffness - the more the inherent stiffness of the mast, the less pre-bend will be achieved by moving the shroud cars forward and the greater the jibstay tension which will result from moving them aft - and vice versa. The relative stiffness of the upper and lower sections of the mast is also important; a stiff upper section will facilitate lower mast bend and vice versa.

5. Lower Shroud Tension - as the lower shrouds are short, lower shroud tension contributes but minimally to fore and aft mast bend or stiffness. As lateral mast bend is directly modified by lower shroud tension, lower shroud tension should be utilised primarily for this purpose. When lower shroud tension is 50% or more of upper shroud tension—because the longer uppers stretch more than the lowers, the mast tip will fall off to leeward, the middle of the mast will be pulled to windward, the jibstay will remain tight, and the upper mainsail leech will open (an appropriate configuration for heavy air). When lower shroud tension is less than 50% of upper shroud tension, the middle of the mast will sag to leeward, the mast tip will be pulled to windward, the jibstay will sag additionally, and the mainsail will become fuller (an appropriate configuration for moderate air).

6. Spreader Position - as the primary purpose of shroud cars is to create, through the upper shrouds, a forward or aft pressure on the spreader tips (thereby pushing the middle of the mast into prebend or pulling it aft so as to stiffen the lower mast), the position of the spreaders relative to the mast is very important. Most people believe that they should be fixed in the lateral mid line of the mast so that upper shroud tension can push them forward as efficiently as aft. If the spreaders are cocked forward (if the attachment of the upper shrouds is forward of the midline of the mast), the mast will be more readily stiffened by shroud car movement aft and less readily bent by shroud car movement forward—and vice versa.

7. Shroud Car "Ramp Angles" - if the shroud car tracks are mounted on ramps which are parallel to the centreline and at a vertical "Ramp Angle" which is perpendicular to the raked mast, shroud car movement will be maximally efficient in both directions. This can and should be checked with the mast in the fully raked (for windward sailing) position by determining where the shroud cars rest when not restricted. If the vertical "Ramp Angle" is reduced (low forward) and/or the tracks "toe out" forward (horizontally), the resting (null) position for the shroud cars will be aft of the midline of the mast and the configuration will readily induce pre-bend with the shroud cars forward but provide little mast stiffening with the shroud cars aft—and vice versa.

8. Lower Shroud Car Position - maximum mid-mast sag and the fullest possible mainsail are sought in moderate air at wind speeds which just begin to require full hiking. To achieve this effect, the lower shroud cars should be in the null position - the lowers maximally eased - in these conditions. In lesser winds one would like for there to be but a slight increase in lower shroud tension (to diminish mast sag and flatten the main) while facilitating pre-bend. This is achieved by pushing separate lower shroud cars forward of the null position or by having "sloppy" (4"-6" of lateral play) lowers attached to the upper shroud cars. As soon as the wind increases above that which can be compensated for by full hiking, separate lower shroud cars should be moved aft of the null position (so as to stiffen the lower mast, diminish mid-mast sag, and tighten the jibstay). Lower shrouds mounted on the same car as the uppers must be tensioned directly. In increasing winds (above 12 knots) the lowers should be tensioned more rapidly than the uppers. As the uppers are moved aft to the null position, their tension (and the tension of accompanying lowers) is reduced; they may not need to be moved father aft (except in chop) until the wind is above 16-18 knots. But in such winds, the lowers should be under much increased tension which means (1) separate cars and tracks for uppers and lowers, and (2) increasing tension in the lower by use of the turnbuckles.

9. Upper Shroud Car Position - the forward shroud car position is limited by the rule which establishes a maximum forward position for the intersection of the upper shroud with the deck. Inasmuch as there is no aft limitation, it seems reasonable to maximise the effect of forward movement (so as to gain optimal pre-bend) and to allow a long track aft to overcome this adjustment (so as to gain optimal mast stiffness). One should assure that the tracks permit the upper shrouds to be brought as far forward as is legal (not to waste a millimetre), but, in addition, should use track ramps at a reduced angle (low forward) or "toed out" (so that the shroud car null position is aft of the mast midline), increased rake, and spreader tips aft. A longer track (if necessary) to bring the shroud cars farther aft in heavy air should be sufficient to counteract these influences. The extremes to which pre-bend is facilitated or negated depends upon the conditions in which the boat is usually sailed. If one never ventures off the light air Swiss lakes, every effort should be made to increase pre-bend; if one always sails in a gale in the Indian ocean off Fremantle, every effort should be made to increase mast stiffness.

10. Sails - one presumes that all jibs benefit by induced jibstay sag in light to moderate air and that all mainsails benefit from having some minimal mast bend to match their designed luff curves - but, obviously, some need more than others and the extent to which one pushes to attain additional pre-bend depends upon the degree to which the sails are benefited. One also presumes that all jibs are benefited by attempts to reduce jibstay sag in heavy air (when it so readily becomes excessive) and that mains should not be overly flattened by excessive mast bend, but, equally obviously, some need more control than others and more or less mast stiffening. Enhanced pre-bend permits a heavy air jib and a tight-leeched main to be used effectively in light air, while increased mast stiffness may permit a light air jib and a loose-leeched main to be carried up into the higher wind ranges.

SHROUD TRACK INSTALLATION

Warning: Do not remove cars from tracks.

(1) Find the breakwater measurement point at the deck edge corresponding to the forward face of the breakwater.

(2) Determine the point 250 mm aft of breakwater measurement point. This is maximum forward point for forward shroud (see Rule 6.2).

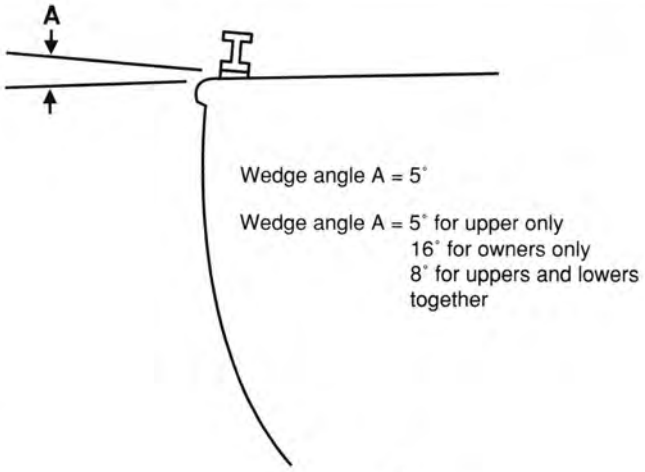
(3) With car in maximum forward position locate centre line of track 1¼ inches in from edge of deck sheerline. Drill ¼ inch hole for forward bolt and insert.

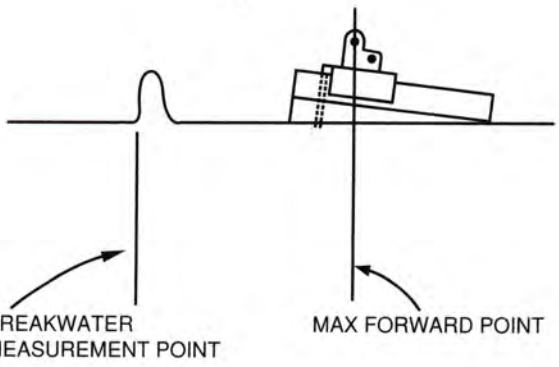
(4) Locate after bolt so that tracks are at the desired angle to edge of deck. Drill and insert bolt. Locate fore and aft hex cap bolts so that the car meets the bolt on a flat face.

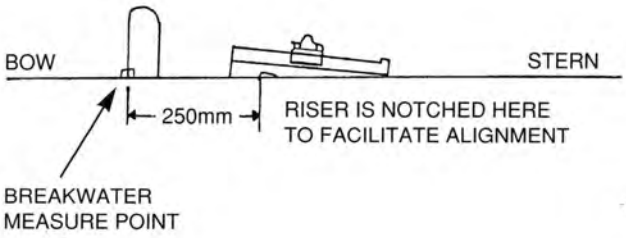
(5) Drill remaining holes and insert bolts.

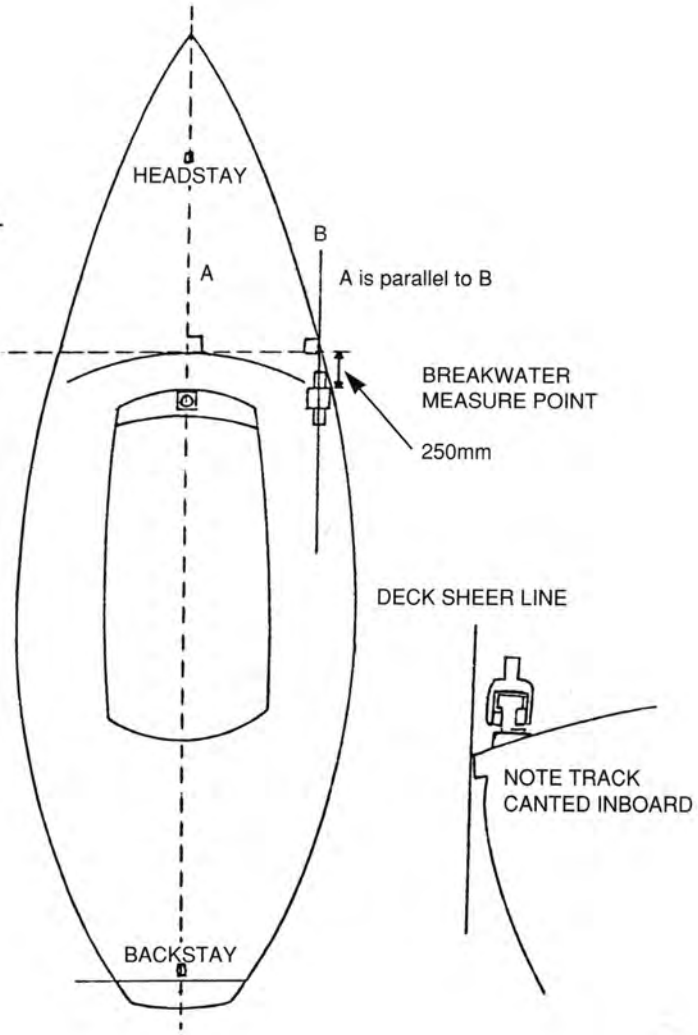
(6) When tightening bolts, be sure to turn nut only to prevent breaking the bolt.

(7) If separate lower shroud tracks are used, the centre line of the inner track must be within 100 mm of the edge of the deck.









TUNING WITH TWO BOATS

by STEVE BENJAMIN

(Steve Benjamin, the 470 Silver Medallist skipper in the December 1984 Games, has been writing in various sailing publications about the benefits to be gained from tuning sessions with two boats. What follows are excerpts from his piece in **Sail**. *At any level of knowledge, what he says is applicable to improving boat speed in a Soling, just as it was for him in a 470.)*

To a large extent your choice of tuning partners will determine the success of the tuning session. If you take the time and trouble to choose an appropriate partner and to organise a tuning session, the rewards will be much greater. The ideal tuning partner

- is as fast or faster than you are in at least one condition
- can be trusted to push his or her boat to peak performance throughout the session;
- co-operates by changing settings or leaving them the same, as the situation dictates
- shares information openly.

Since your goal is to improve boatspeed, it is of little use to tune with a partner who is slower. Usually your partner will feel the same way, and a good compromise can be struck among teams that excel in different conditions. A light-air expert and a heavy-air specialist can tune together and thereby improve each other's performance in the weaker condition.

In the best tuning sessions, partners first agree on who should change and who should stay the same. If both boats change their settings or their equipment, little is learned. The concept is that one boat changes and evaluates that change against a constant partner. If just one boat does this, quite a lot can be learned. If both boats are constantly changing, neither one will know for sure which setting or equipment produces the best speed.

Sharing information between partners makes the tuning session far more valuable. If one crew makes a change that improves boatspeed, the other crew should be told what was changed. That change can then be tried by the other crew, so that both boats end up going faster. By using this technique more variables can be tried and superior results obtained.

One of the most difficult techniques to master when you begin tuning is learning to start fairly. Assume that two boats are starting a tuning run. The leeward boat should be a half-boatlength ahead and two boatlengths to leeward. Both boats should be moving at about two-thirds their potential speed and watching each other. When the speeds are equal and the positions correct, one helmsman nods to the other and the tuning run begins. If the starting positions are not as described, one of the following problems may occur:

- the leeward boat will be too close to the windward boat and because of the lee-bow advantage will appear to be much faster
- the windward boat will start too far ahead of the leeward boat, soon giving the leeward boat bad air and forcing it to foot off;
- the two boats will be too far apart and may be sailing in different wind conditions.

I define a tuning run as a period of sailing that lasts until one boat gains a clear advantage or until no difference can be demonstrated. Usually a difference in speed becomes obvious within 2 or 3 minutes. However, if the boats sail for 5 minutes without one moving ahead, they are close enough in speed to call it even.

To confirm the results of the first run, the boats should start again *without* making any changes. If the same boat is faster, then a third and fourth run should be tried, but with the boats swapping positions. A speed difference that still exists after the fourth run should be obvious, and the slower boat should be the one to experiment. Ideally, the slower boat consults with the faster boat to seek advice and to agree that the faster boat will remain the same.

Sometimes such a large difference in speed exists that the slower boat should make changes immediately, rather than taking the time to do multiple tuning runs. Sailors who are experienced in tuning can sail for as little as 1 minute, realise a speed problem exists, make the adjustment, and begin tuning again with much better speed.

The result of the tuning run can be affected by wind shifts and other external factors that are not related to relative boat-speed. For this reason it is important to swap positions. It is also useful to practice being both the windward and the leeward boat so that you don't become overly used to one position.

Tuning runs should be tried on both tacks because quite often one partner has better speed on one tack. This may be because the boat sets up differently from tack to tack, or because there are different sea conditions on starboard and on port. If one boat is consistently faster on one tack, look for a symmetry problem in the mast, centre board, or keel.

Once the slower boat has made a change, it probably has improved speed and will be either equal or superior to its partner. If this is the case, the partner should now change and also try to improve speed. The tuning process continues in this way, with each partner taking turns, trying changes, and evaluating results. If one boat is consistently slower, the crews should try swapping boats. The faster team may be able to make the slower boat go faster, either through superior ability or by making improvements in tuning.

INTERVIEW WITH ROBBIE HAINES

from May 1987 Leading Edge

How much rake should I carry?
My general rule of thumb is to carry as much rake as you can and still have enough to adequately sheet the main. By this I mean have reference marks on your headstay line with light, medium and heavy settings. I used to think that a fixed headstay was sufficient; but now I feel that the boom right on the deck is faster. This will require more rig adjustment, but it's needed, I feel.

Where should the jib leads be set in different conditions?
A good overall position for light to medium (4-8 m.p.h.) is 13 inches out from the middle of the mast. This seems to be a good starting point and 3 inches in or out seems to be the range for most conditions. There have been times when we have been extremely fast with the leads pulled in all the way. This was in smooth water, 12 knots of wind. Crew weight is another big factor in lead position. If you have average crew weight (550 580 lbs.) these measurements are alright. If one sails at 500 lbs., I would suggest easing it out more than pulling it in. When tacking we can't adjust the leads. Some people do, I just haven't tried it. It seems that easing the jib an inch or two seems sufficient.

Where should I mark my backstay so that I can get an accurate reading?
Many people have tried using a plastic tube over the wire with marks. This seems o.k. but I just mark the backstay with a felt pen or good tape. The drawback with tape is that it's possible to pull the backstay so hard that the tape moves. My mark is usually 2 inches above my maximum backstay pressure. In lighter winds this mark is higher; I just remember the distance it is off the deck.

What is good tape?
We have used the grey duck tape for years. There are, however, good kinds and bad. The bad stuff is the kind that is thicker and has a vary shiny finish. We make a real effort finding the best stuff. There are many times we use it for patching ripped spinnakers.

Mast bend, how much and when?
This is difficult to answer. Basically the way I approach this is to give the following numbers. In 8 knots 7 or 8 inches, in 15 knots 10 inches and in light air 4-5 knots about 4-5 inches. This more than anything else varies on crew weight, wind speed, and wave conditions. Use these for the basic set up. The trick to proper backstay tension is to learn when the sail looks fast, which comes by experience. The learning process can be shortened by having someone show you exactly what is right.

How much jib halyard tension in different wind strengths?
Just enough to eliminate the scallops along the luff is my first answer. Our jib has been designed to be right (draft position) with a limited amount of adjusting. It is better to have not enough tension than too much. In other words, too much halyard is much slower than not enough.

When tacking, should I ease the jib sheet?
Yes, in almost all conditions. We ease it all the time up to 15+ knots. In smooth water it's not as important, but in choppy water it's essential. In the recent Podolak series we experimented with this and found it extremely slow to keep the sheet cleated. The boat needs the extra power out of a tack.

When sailing to weather, where should the weight be? Forward or aft?
My feeling is that it should be forward. When we rigged US851 I tried to keep the crew as close together and well forward. The crew being close is more important than fore-aft position.

When should I pinch or foot in different sea conditions?
In a Soling it doesn't hurt to have the windward telltale lifting. I

Vince Brun, Bob Kinney and Robbie Haines.

INTERVIEW WITH ROBBIE HAINES – continued

always have it moving in most conditions. In rough water it's not a good idea, but both telltales should almost never be flowing back. The boat needs to be stuck into the wind. In a breeze, feathering is the most efficient way to reduce power. By feathering I mean pointing to a point where the boat loses power, thus keeping it flatter, which is fast.

Should I heel a Soling or should I keep it flat all the time?
In over 6-8 knots keep it flat in all conditions. Sometimes I have found it better to heel in choppy water but not very much. It is also faster to keep your crew mini-hiked rather than sitting on the deck. This is one problem we had with Lowell and Rodney. In marginal hiking conditions I would let them come in. This is not right. Keep your crew over the side until they are continuously dragging. Watch out crews?

Will yelling at your crew do any good?
Yes. In some conditions. I yell a little bit, but most of the time it only flusters them. After sailing with Melges, even the experts yell at times. Practice is the key. If they know their job, yelling isn't needed.

What is the correct position of the pole?
The general rule is to keep the clew even. If the pole is too low in a breeze the sail will look different. My rule is to keep it all the way up in 10 knots and above downwind and reaching. In lighter winds it varies on your angle downwind, and sea condition. We do adjust this continuously with different velocities.

Downwind, should the middle crew play the guy and sheet?
Absolutely, if he is strong enough. Sometimes it isn't needed, but in California the ocean swell usually makes it vital in the lighter wind ranges. If one properly does this he will definitely be faster. In strong winds we usually pump the chute to get on waves. After that it is illegal to continue it. A Soling is very heavy, and to do this properly takes a lot of muscle. We sometimes take turns pumping the guy. I do it, then the forward man does it. It really takes co-ordination.

In close reaching conditions should the crew be mini-hiked or leaning out?
If both crews or crew can mini-hike, this is faster. It is faster to get the weight low. On our Soling we have a type of hiking system that can be adjusted to let the crew mini-hike or lean. I feel this is important, mainly because of speed, but also visibility. Looking at waves is critical. Sailing with Melges was an experience; he is always looking over his shoulder for the next wave or puff. Upwind, he never looks at the jib, always upwind for more wind; and has no telltales on his jib.

Where should our weight be downwind, reaching?
When sailing downwind, try and move all crew members and yourself forward. This seems faster, allowing the transom to get out of the water. In fact, in some races Lowell would sit on the foredeck. We never notice this to be slower. When reaching in light winds, keep your crew in the normal upwind position. In a breeze, move everyone aft. The middleman should be at the skipper's position and the skipper should be on the after deck This gets the bow up and out of the water, which is fast reaching.

I have an older Proctor mast, should I buy a new one?
I usually tell people no. The amount one spends on a new rig ($1000) far out-distances the speed advantage of say, a new bottom job. Proctor masts have good points . . . the main one being that it is stiff, and has a minimum tip weight. The bad part is the taper. It is very thick sideways at the top. Now, if you feel that is worth $1000, I recommend buying a new one, for psyching purposes.

INTERVIEW WITH ROBBIE HAINES – continued

Should I wet sand the bottom or keep it shiny?
Wet sanding or a dry finish are both equally fast. I have always preferred wet sanding, but we recently had a new paint job that shouldn't be sanded, and we were as fast as ever. Hull fairness is the important bottom factor. The keel and rudder must be fair, and only block sanding and filling can accomplish this. Lots of hard work for an unmeasurable speed difference, but all these small items add up to a difference.

In most big regattas (three days or more) the boats are required to be left in the water. Should they be sanded or rubbed down?
In warm weather (and warm water) growth starts within hours. We always rub down after the first day. Coral starts usually on the side facing the sun. We sand this and sometimes around the waterline, where oil and dirt collect.

You seem to always have an excellent crew. What is the reason for this?
I guess first-class crews migrate to the winning boats. It is my opinion that if an owner takes time in finding two guys who are willing and can take the time to crew, winning a boat race will come a lot easier. It's amazing what a dedicated crew can do, both for boat performance and skipper psych. Try and get the same crew for every race; unfortunately this is easier said than done. Winning a Soling race is a team effort, no one person should be singled out as the main reason for winning.

BOAT SPEED

by ROBBIE HAINES

Reprinted from *Soling News* A.I.S.A.W.A.

When should I pinch or foot in different sea conditions?
In a Soling it doesn't hurt to have the windward telltale lifting. We always have it moving in most conditions. In rough water it's not a good idea, but both telltales should almost never be flowing back. The boat needs to be stuck into the wind. In a breeze, feathering is the most efficient way to reduce power. By feathering I mean pointing to a point where the boat loses power, thus keeping it flatter, which is fast.

Should I heel a Soling or should I keep it flat all the time?
In over 6-8 knots keep it flat in all conditions. Sometimes I have found it better to heel in choppy water but not very much. It is also faster to keep your crew mini-hiked rather than sitting on the deck.

What is the correct position of the pole?
The general rule is to keep the clews even.

Downwind, should the middle crew play the guy and sheet?
Absolutely, if he is strong enough. Sometimes it isn't needed, but in California the ocean swell usually makes it vital in the lighter wind ranges. If one properly does this one will definitely be faster. In strong winds we usually pump the chute to get on waves. A Soling is heavy, and to do this properly takes a lot of muscle.

In close reaching conditions, should the crew be mini hiked or leaning out?
If both crews or crew can mini-hike, this is faster. It is faster to get the weight low.

Where should our weight be downwind, reaching?
When sailing downwind, try and move all crew members and yourself forward. This seems faster, allowing the transom to get out of the water. When reaching in light winds, keep your crew in the normal upwind position. When reaching in a breeze, move everyone aft. The middleman should be at the skipper's position and the skipper should be on the after deck. This gets the bow up and out of the water, which is fast.

When sailing upwind, do you adjust your traveller or backstay, or both?
In puffy conditions, the backstay is trimmed or eased frequently. We feel this is important but the main and traveller are more important. Mainsheet tension is first, always look at it in puffy conditions. If it gets light, ease the backstay an inch or so. When you get used to it, it can be done with only a quick glance. In windy conditions, the traveller is your power source. The boat has to be sailed flat, and to do this your hands should be on the tiller and traveller all the time, constantly adjusting to puffs and lulls.

When tacking in hiking conditions who eases the jib?
The forward man always releases the jib in a tack and slowly brings it in when speed is attained. I feel the best rig is the Abbott with the cinter control. This is much more simple than the "fine" adjustment.

Is the fine adjustment necessary?
I haven't really sailed a boat with the fine adjustment. My feeling is that when the sheet needs to be eased, tacking or before excessive waves, the sheet needs to be adjusted very quickly. With the fine adjustment, the purchase is so powerful the sheet goes out very slowly.

In top-level competition, practice seems to play a very important part. Why?
A well-trained team is very important. Many races are won and lost because of mistakes. Our team is very good, but we go out sailing once a week and set up a very short course and go through the sets, jibes and drops. It does get boring but we feel it's essential in gaining an Olympic berth.

What does your middle man do upwind?
We have a unique system on our boat. Eddie is very knowledgeable on sail shape and has complete control of it during the race. Occasionally I will disagree, but 99% of the time he sets the main. He also adjusts the mainsheet, vang, cunningham. This works out well because I can concentrate on steering.

Would you briefly explain Rod and Eddie's jobs on spinnaker sets?
Approaching the weather mark, Rod, who is forward, takes the pole from the boom and hooks it on either upper or lower ring. The top lifts and foreguy are already attached, so this process is very quick. Eddie is still hiking and when we are

BOAT SPEED – continued

about one boatlength, he comes in and throws out the chute. Rod hoists. I pull the guy back. Eddie trims the spinnaker until Rod gets the halyard coiled. Of course, while all this is happening the jib has been eased, car released, cunningham off, mast unbent slightly. Then dropping, Rod takes the pole off and stores it on the boom, Eddie gathers spinnaker to windward, but between the lower shroud, shrouds and mast. Eddie gathers it in his pouch and hikes, unclipping the pouch as he goes out. Rod turns 180° and lies on his stomach to keep weight outboard, he then hooks up the runner, tightens loose sheets and clears up the bottom of the boat. This all takes about 30 seconds!

MELGES ON . . .

report on a seminar conducted by BUDDY MELGES

Racing One-Design Sailboats in top competition has become such a complex game that it is often worthwhile to stop and think carefully before deciding what skill or piece of equipment should receive top priority for next season. When I heard that the Seattle Soling Fleet had invited Buddy Melges to talk, I decided that this would give me a good opportunity to hear what one great sailor views as the top priorities when preparing for and sailing a race. It is hard to imagine a better qualified person. Buddy holds two Olympic medals, one in Solings and the other in Flying Dutchmen and has won the Mallory competition three times. When you consider that he comes from Zenda, Wisconsin, which, as he says, is "a gin mill and a boat company (his) in the middle of a corn field", his record is all the more impressive.

I was not disappointed Buddy spoke for four hours and had his audience listening carefully the entire time. His talk was lively full of enthusiastic descriptions of races and, most important, liberally sprinkled with his ideas on how to win a major championship. What follows is a recap from my notes of points that Buddy emphasised or that were new to me.

On learning and practice

Spend more time practicing and studying your sails and the other fast boats' sails than you have been. Before the last Olympic trials, Buddy and his crew sailed three days a week in all types of weather on Wisconsin's Lake Geneva. There were no other Solings, but they often took out a powerboat so that they could get off their boat to study their sails. They sailed throughout the year and, on some days in the depths of winter, sailed iceboats on the frozen part of the lake and the Soling later on open water at the other end of the lake. They put themselves through all sorts of simulated race situations, and eventually they were able to sail with almost no commands needed during tacks, jibes or normal sail. Buddy emphasises the importance of looking at your sail from outside the boat. He feels that there are important attributes of sails that are virtually impossible to study adequately from inside the boat, in addition, he is obviously very flexible and willing to learn from his competition. He once sat out a Soling World Championship and just watched how the best helmsmen handled their boats and set their sails.

On experience

He attributes a lot of his success to his extensive experience in high-speed boats on inland lakes. Buddy is an expert iceboat helmsman and races a Skeeter on Lake Geneva whenever there is good ice. He feels that these boats, which can achieve speeds on the order of 100 m.p.h., make one a sensitive judge of the vital relationship between speed and wind angle. He also has won consistently in various scow classes and in the Flying Dutchman. These planing boats provide a bridge between the iceboat and Soling in terms of the rapidity with which boat speed is affected by wind angle and sail trim. In addition, Lake Geneva's large and frequent wind shifts have made Buddy super sensitive to the importance of shifts both upwind and down. Melges, like Elvstrom, does not depend heavily on compasses relying instead on his ability to read the shifts off the water to windward. Practice on Lake Geneva helped develop this skill. "Back on Lake Geneva," he said, "we think compasses are for hunting."

On hull preparation

Buy from the leading builder in your class. Arrange the controls so that they are right where you want them, and neither you nor your crew need divert your attention to use them. Carefully prepare the underwater surface so that you know they are the best possible. He fairs the bottom of his glass Soling using sandpaper on a three-eighth-inch-thick foam sanding block, first with 320 wet or dry, then 400, 500, 600, DuPont hand rubbing compound and, finally a fluorocarbon spray. I saw him devoting many hours to the bottom of his boat at the Kiel Olympics. In addition to providing a flawless finish, Buddy seems to be trying to "one-up" his competitors with his attention to his boat and to use the activity to release his own reservoir of excess energy.

On sails

Look at the sail from all angles, both off and on your boat. Looking up at the main from under the boom is helpful. The angle that the top batten makes to the boom provides a good guide to leech tension. The vang is more critical to boat speed to windward than downwind (on a Soling). Leech setting depends most on the sea condition. In smooth water, little twist is best. In chop, the leech should be eased to allow lots of twist. Sheets can be eased and the traveller brought to windward of the centre line to achieve this. He is of the opinion that twist helps reduce pitching moment by reducing drive high up in the sail. The same considerations apply to the jib - a twisted leech being best in a sloppy sea, and a tight leech in smooth water.

On windward legs

Bunch crew weight fore and aft. He looks at the horizon as he

MELGES ON . . . – continued

sails, judging the angle of the forestay to the horizon. He sails a scalloped, "gyrating" course, up and then off again. When there are waves, he heads up while the bow is rising on a wave, then bears off just as the crest passes under the boat and sails off as the bow goes down the back of the waves. Heading off just at the moment that the crest is under the middle of the boat minimise the resistance associated with bearing off since both ends of the boat are, relatively speaking, out of the water. If a competitor is nearby, try to point highest whenever he looks over at you. He gave one clue that I am not sure I would even know how to try. He said, "If you can get in rhythm steering with the movement of a pumping headstay, its amazing the speeds you can achieve."

On downward legs

Spread crew weight fore and aft when riding down waves. Buddy often stands up, studies the yarns on the weather shroud and holds one or both of his spinnaker sheets. He stresses the importance of playing shifts and seeking the best angle to the apparent wind at which to jibe downwind. To windward, you tack on the headers and to leeward you jibe on the lifts. Just as on a weather leg don't go way out to one side, but play the shifts down the middle. Don't change course sharply as that always costs you distance. To check that your course angle to the dead downwind line is a good one, sail 100 yards or so off that line, then jibe and come back to it. At this point see if you have gained on the other boats. Buddy doesn't remember the last time he was in a "dog fight" (luffing duel), but he always tries to arrange his downward tactics so that the other boats are likely to stay bunched or luff one another. He uses aggressive tactics and tries to jam the fleet together so that they will interfere with each other.

Offwind sail trim

The main should be baggy with mast raked forward if possible. A small flat spinnaker often pays off in winds under 4 knots. By all means maintain flow across the spinnaker. "Ventilate" the chute and don't let the air in it become "constipated" due to a tight leech. When the wind is over 12 knots, start to play the waves. On a run in these conditions, heel the boat to windward and "skid" it downwind. "If the spinnaker is not dancing, it's overtrimmed." If the spinnaker luff is uncontrollable (i.e., normal trimming does not prevent its collapsing) lower your pole until it becomes controllable. On reaches a properly cut spinnaker requires that the pole be set at right angles to the headstay. In heavy air when you are about to broach, pump the helm to "give the water back to the rudder" and prevent the rudder from stalling, and ease the vang to free the leech. In winds over 18 knots, he sets his small chute.

At the start

Come in on port tack and find a hole in the line of approaching starboard tackers. Try to avoid having anyone nearby on your lee bow as the windward boat in this position always sails in a header relative to the leeward boat, just as the main on your boat sails in a header induced by the presence of the jib. This can be particularly deadly if you are the windward boat of several packed side by side on the line.

Now let's see: Where can I get a Styrofoam sanding block, a motorboat and the time to practice three times a week!

BIG FLEET STRATEGY

In a small fleet starting at the preferable end (and there always is one) provides a few boat lengths advantage, a position nearer the advantaged side, and/or an opportunity to reach the next header ahead and to leeward of the fleet. In a big fleet starting at the preferable end provides an opportunity to be caught in a crush, to be driven over, to be forced to tack to the wrong side of the course, and/or to be detected as starting prematurely. One cannot plan on getting a good start at either end because one cannot plan on one's competitors obeying the rules. In a big fleet the entire range of possible behaviours must be expected including arriving early, bearing away, colliding and ignoring all usual restrictions. Hailing, objecting, and protesting are to no avail; ultimately a collision, legal or illegal, or the risk of one obviates any advantage which might otherwise have existed.

Standard practice in moderate-sized fleets (unless the wind is oscillating) is to sail the lifted tack until one half to two-thirds the way to the layline and then when some slight header appears to dig back in towards the rhumb line. One attempt to keep inside and to leeward on the tack back and to avoid reaching either layline until the last possible minute. In a big fleet, even if one has the opportunity to sail the preferred tack towards the layline he is unlikely to find an open slot along which to tack back to the rhumb line. And if he does, he's likely to find that those who continued out to the laylines are sailing over him, often from both sides.

In one race of the World's, I obtained a good start at the port end and congratulated myself upon obtaining the clear air necessary to going the "right" way. However, at the mark I thought I was fourth amongst those coming in on the port tack layline, two others from the far right corner also slipped in ahead! On the final beat in another race I attempted to play the oscillating shifts up the middle. I noticed that we were pulling away from those in the right corner but was amazed to discover that despite a mere 5° net shift their way, I lost about ten boats who had gone all the way to the left. Hans Fogh, who was amongst these, pointed out that although a net shift of 5° doesn't seem like much, when it is combined with more air, it can easily make a ten boat difference. Almost every beat of the 21 at the World's demonstrated an advantage to one side or the other. Going up the middle never seemed to pay.

There are several logical explanations for this observation. The winds at Anzio were seabreeze/weather system combinations characterised by a tendency to shift towards one or the other of the wind sources (depending upon their strength and the time of the day). This condition is characteristic of international championships which are always held "in the open sea", i.e., along shores which tend to produce seabreezes aligned to varying degrees with weather system winds. But big fleets create this effect regardless of the wind for the following reasons:

(1) The wind is so adversely affected by a big fleet, so disturbed within the diamond between the laylines, that only those boats on the periphery have clear air. Big fleet racing, particularly shortly after the start and as the fleet converges at the weather mark or the finish line, is therefore much like light air racing. The middle must be avoided in each condition because there the wind is more disturbed and the boat has to be tacked more often.

(2) "In big fleets someone will always get it right". So says Paul Elvstrom about boat speed in big fleets but the aphorism also applies to strategy. "Getting it right" (except in oscillating winds) always means one layline or the other. In small fleets few will dare go to the layline and those who do are unlikely to have the speed to make good their advantage. The fast boats all play it conservatively, "digging in" well below the laylines. But in big fleets where there are many fast boats, there will always be some who by election or necessity will go all the way to the corners. And if you are going to beat these, you'll have to go there with them.

The advantages of the laylines are, of course, enhanced by big fleet scoring systems which tend to reward brilliance and justify risk-taking. A couple of bullets will win most big fleet events (and there is no doubt these are more likely to be collected from the corners) both because there are significant bonuses for high placements and because a throw-out, usually provided, can eliminate one disaster.

I remember the winning of the 1975 European Soling Championship by Stig Winnerstrom, one of the all time great corner shooters. We had close to 20 races started at Alassio to get in five: the other 15 were abandoned because of insufficient wind. Stig was always in one corner or the other when the races were abandoned, sometimes so far in last that we could hardly tell he was a Soling. But at least five times he was in the right corner. I thought at the time that he had merely been fortunate to have had the five races in which he went the right way count. Now I recognise that his victory was not merely good fortune but good sense. Sailing as he did would not have guarantied a win, but sailing conservatively would have guarantied a loss.

GET IT TOGETHER . . . TOGETHER

by MARK BETHWAITE

REPRINTED FROM *MODERN BOATING*

I have stressed the need for confidence in speed which requires the attainment of speed, best achieved by two boat tuning. The ability to reproduce that speed under regatta conditions is crucial to success.

The other side of the confidence coin is boat handling ability. As is the case with boat speed, it is essential for a crew to be able to handle their boat at least as well as any other team against whom they are competing. The importance of team work cannot be overstated.

The best helmsman in the world will not be able to steer well unless he is backed up by good crew work. Conversely, the best crew in the world cannot perform well if they are let down by their helmsman. Nowhere is the importance of good team work more critical than in tight racing conditions, where boat handling is at a premium.

As with boat speed, the need is to be able to manoeuvre at the start, to tack, gybe and to set and drop spinnakers as well as, or better than, anyone else competing. And as with speed, competitors who profess to be keen to win regattas consistently show the same boat handling weaknesses.

It is apparent that competitors showing those weaknesses either have not acknowledged their existence or have not worked to eliminate them.

Crews with boat handling weaknesses put themselves at an obvious disadvantage to competitors with superior boat handling. If your ability to engage in pre-start manoeuvres is of a lower order than a competitor's, you are vulnerable to attack by that competitor (match racing at the start is not confined to the America's Cup). If you are weaker at tacking or gybing than a competitor, he will endeavour to take you on in a tacking or gybing duel. Similarly, the ability to handle spinnakers neatly is vital to the outcome of races and regattas - the ability to hang on to a spinnaker longer than others when tight reaching or in a buoy rounding situation.

The confidence I have in my crew's ability to outperform other crews in those situations has won us many.

Again, as with speed, there must be no "chinks in the armour". But there is no magic answer to the attainment of boat handling ability. The best way to achieve those skills is by short circuit training.

Buoys are laid in an Olympic triangle configuration at much closer spacing than the normal Olympic course. In light weather, the windward leg should be approximately 200 metres, increasing to about 400 metres in a strong breeze. In shallow water, such as Port Phillip or the Swan River, it is easy to lay your own course: four-litre plastic bottles painted bright orange, on anchor line of synthetic cord tied to a brick, will suffice, On Sydney Harbour, our normal practice is to select three permanent buoys to form the desired triangle.

Having set the circuit, you proceed to train by sailing around this course, preferably in competition with other boats. Even if other boats are not available, the close spacing of the buoys simulates the pressure of close racing under regatta conditions and, under this pressure, faults in crew work become immediately apparent.

As with development of boat speed, there is no substitute for hours on the water and this type of training is, in my view, the best possible preparation (better than gym work, jogging or other fitness exercises) for a major regatta. Not only is fitness acquired but the right muscles are exercised and the body (especially the hands) is toughened.

Besides faults in crew work becoming self-evident, faults in systems on the boat also become obvious. From sailing by invitation in a number of boats over recent years, it is my conviction that unless a boat is easy to sail it cannot be sailed well under regatta conditions; unless a system is easy to operate, or a sail easy to retrim when gear changing is required, it will not be done as often or as effectively as it should.

Short circuit training is the best possible way to identify faults in boat layout and operation. Improvement in crew work and boat systems should be complementary and occur progressively as the level of training intensifies.

It is essential to develop crew work over the full range of conditions. Retention of speed by minimising and smoothing crew movements in light air is as important as survival ability in heavy air.

While it is not sensible to use your best sails when training in heavy conditions, the confidence in the performance of the crew and strength of the boat and gear gained from heavy air training can be critical to the outcome of a regatta. Three specific examples come to mind.

Prior to the 1976 FD Olympic trials, Tim Alexander and I sailed in all conditions every weekend and after work every day for two months. We won the trials through our ability to stay afloat at one mark of one race where all our principal competitors capsized.

Before the 1982 J24 World Championship, some of our training took place under extreme weather conditions (one day we sailed in a westerly which was unroofing houses). The confidence and crew work we developed allowed us to win the heavy weather race in the World's by five minutes.

Lastly, prior to the recent Australian Soling Championship, we trained one day in very strong southerly frontal conditions. Although that cost us a bent mast, it ensured that when similar conditions occurred in the championship, both boat and crew were up to the task allowing us to win by a large margin when our competitors were broaching and breaking gear.

WHAT WE LEARNED IN EUROPE IN THE SUMMER OF '87

We learned a great deal and progressed significantly as we learned - "finishing" with a tie for eighth (out of 64) at Garda in the Dino Schiesaro - in the top ten in eight out of the ten regattas we sailed.

1. Old sails are often as good or better than new ones. After a dismal showing at the Kiel World's, testing with two boats (completely at our disposal) over a two-week period and switching sails, sail combinations, and crews repeatedly in a wide variety of conditions, we learned that the new FP-6 main with which we had been racing was the slowest we tested. By far the fastest combination in smooth water under 10 knots was a 1984 AP main, not only vastly superior to the new FP-6, but better than a new AP as well. (The best very light air jib I have is one made in 1980. And remember the sails that won the World's in 1988? - a three-year old AP main and a not very new A-I jib.)

2. Sailmakers are still unable (sometimes unwilling - perhaps a little tuck here or there will be faster?) To make new sails identical to previously made ones (this is not a new discovery - it's just that I had momentarily hoped that it was no longer true!). (I still have and have tested a 1980 heavy air jib which performs almost as well as the brand new ones and a lot better than the supposedly identical ones made between 1980 and 1986!) The cloth undoubtedly varies, but so does the construction. (Sailmakers undoubtedly recognise this and discard and replace their own lemons quickly).

3. In smooth water shroud car position - from the midline forward - once backstay position has been applied, has little effect upon jibstay sag. In other words between 5 and 10 knots in smooth water (once the backstay is tensioned sufficiently to keep the jibstay from pumping), it makes no difference (observations during careful testing) whether the cars are all the way forward, half-way forward, or in the midline of the mast.

4. Shroud car position is extremely important in waves. The transition from racing on the Thunersee to racing on the Baltic required a dramatic difference in shroud car position. If the shroud cars are forward of the midline, in any sort of chop the jibstay will pump and ruin the flow over the jib. Thus once the backstay is applied (smooth water or chop) - to bend the mast or tension the jibstay, the shroud cars should be in the midline (or aft).

5. Shroud car position aft of the midline tensions the jibstay significantly. If the jib needs (or accepts) a tight jibstay and the main tolerates a relatively straight lower mast. The shroud cars should be aft of the midline in proportion to the wind velocity (above 12-15 knots) and the wave height.

6. In heavy air the boat needs speed, not pointing, and it should respond to gusts with acceleration, not yawing and heeling. Both sails must be highly twisted (more than I had previously presumed) to adapt to large variations in velocity and true wind direction. Their twist must be complementary (matched) so that neither is flogging or even fluttering excessively. Once the appropriate mainsail flatness and twist is achieved, the jib traveller and the jib sheet must be eased until the main is only minimally backwinded. The final tuning of mast bend, sheets, and travellers depends upon the boat feeling "fast", being in balance, the helm "light", the boat easy to steer. And, of course, the sails (in smooth water, primarily the travellers – in waves, primarily the sheets), in response to gusts and lulls, must be played.

7. Local knowledge sure helps (particularly on lakes). New Zealander, Russell Coutts, won at "Intervela" because he spent the preceding week going round and round the course. Whereas we (and the others) often made the wrong move when the wind died or shifted dramatically - as it regularly does along Garda's western shore, he almost always made the right one.

8. Go for the shift, not the wind. Upwind, in offshore winds (on lakes all winds are offshore), it almost always paid to go for the shift - which tended to persist and involve a large area homogeneously - rather than for an area of increased velocity - which tended to be evanescent and irregularly distributed.

BOAT HANDLING AT ROCHESTER (1991 World Championship)

by STU WALKER

Some competent observers thought the boat handling of many, including some of the Olympic aspirants, showed inadequate training. The rounding of the weather mark, for instance, often resulted in slowing when the main was insufficiently eased and the middle man came inboard too soon. The leeward mark was often rounded with the jib stalled and the main loose. The 720° alternative penalty turns were often performed with the same failure to steer with the sails. The farther back a boat was in the fleet the more belatedly its spinnaker was dropped and the less likely the boat was to be prepared for the beat ahead. After rounding the jibe mark many boats failed to round up quickly and so were overrun by those rounding astern. Many allowed the new guy (in the absence of adequate control by a twing) to escape upward making it difficult to attach the pole and most failed to slap the outer end of the pole forward against the spinnaker tack - a technique that prevents the luff from collapsing as the boat is turned upwind and brings the pole's inboard end up and to windward in line with the mast ring.

Watching Jochen Schumann, Thomas Flach, and Bernd Jaekel round a leeward mark was a contrasting treat. The backstay (and presumably the other upwind controls) were set before the boat reached a position four boat lengths from the mark. At this time the spinnaker halyard was released and as one crew detached and stowed the pole the other brought the spinnaker foot aft and the head down so that the sail seemed to disappear into the cockpit. By the time the boat's bow was at the two boat lengths circle only a corner or two of the spinnaker were still visible. As the boat began a long sweeping turn the middle man, sitting far enough in board to permit moderate heeling, was gradually trimming the main. The foredeck man, having completed the slowing of the spinnaker and its sheets, was watching the telltales and slowly trimming the jib to accommodate the turn and the aft displacement of the apparent wind. Jochen was standing in the cockpit watching the boats around him, steering close to the mark. Finally on course with the main properly trimmed, but the jib still open and twisted, Jochen sat down and the crew assumed a hiking position appropriate to the wind strength.

Heavy Air Lessons

To windward many jibs were too full - sheeted too hard with travellers too high using clew holes too far aft (or tacks too far above the deck). Many mains were insufficiently twisted with the upper leech too closed and the boat heeled and sluggish. Lower shrouds were often under insufficient tension to permit the top masts to fall off to leeward and provide an open upper mainsail leech when the boom was sheeted in hard amidships (as it should be to provide good heavy air pointing with minimal leeway).

However, the greatest faults were in spinnaker handling. On the tight reach poles were often not pulled sufficiently far aft of the headstay - less than a foot usually means that the tack of the spinnaker is to leeward of the centreline and the spinnaker too full. Poles were often angled upward at an angle greater than 15°, reducing the extension of the pole, easing the spinnaker luff, moving its draft aft, and tightening its leech. This problem was particularly evident with the mini-spinnaker, the advantage of which was largely negated by the high pole. These narrow shouldered sails need luff tension from a pole carried low to bring the draft forward, provide stability, resist collapse, and open the leech (to reduce side force, heeling, and broaching). A large spinnaker set with a low pole could have been (and was by such experts as Hans Fogh) managed more readily than some of the wildly oscillating, high poled minis.

The spilled halyard technique to deal with the too tight heavy air reach has become standard. Many of the top sailors came into both jibe marks with their sheets trimmed hard, their poles just off their headstays, and their spinnaker halyards eased to permit their spinnakers to float out horizontally ahead and to leeward They headed high so that on the approach to the jibe mark they could bear away, rehoist their chutes, jibe them dead down wind, and come gradually up to the new course. I was surprised to see how many spinnakers flailed about on the jibe and how long it often took to refill them. Few seemed to recognise the advantage (preached by Gold Medalists Eddie Trevelyan and Rod Davis years ago) that the middle man should pull back the old guy to stretch the spinnaker squarely across the bow, cleat both sheet and guy, throw the boom across, and then retake and trim the new sheet. The helmsman can aid this process by easing the guy after the boom crosses, but in big winds and seas should concentrate on steering the boat - down as the boom crosses and then gradually up to the new course. When so managed with its sheets cleated on predetermined marks the spinnaker should hardly quiver (let alone collapse).

One of the best manoeuvres that I observed was by Roy Heiner's team. Coming down the run in 25 knots far in the lead, he attempted a jibe. Midway the bow dug in and the boat abruptly rounded up toward its original course, laying over at a 45° angle Someone cleverly released the spinnaker halyard - to exactly the right degree, the spinnaker floated innocuously ahead, and the boat immediately righted. As soon as it was back on course, the spinnaker was hoisted and the jibe completed - all within 30 seconds! It looked to be a practiced manoeuvre - and if so an excellent one as without the yawing movement of a full spinnaker far to leeward, the boat could be steered with ease. Its success would have been dependent upon the sheets being cleated during the jibe - and therefore cleated when the halyard was released - without which the manoeuvre would have been highly dangerous! Even if practiced, the alacrity with which the entire manoeuvre was carried out was impressive. How I wish I had thought of it on a few occasions in the past!

UPWIND

TRIM, TRIM, TRIM

by FRANK BETHWAITE

In recent weeks it has been my privilege to be reminded yet again, that people from different places approach their sailing from totally different backgrounds. The prairie sailors of Saskatchewan have never learned what a steady wind is, while Sydneysiders would find it hard to imagine the contrariness of air which prairie sailors assume is normal. The place where people sail must colour their priorities.

But the differences go deeper then just the places and conditions that people sail in. What they sail, how they learned to sail, and what they are now beginning to expect from their sailing, are even more important. As I move amongst the various groups, listen to their questions and watch how they sail, they seem to fall into three separate groups.

In North America the emerging group are the sailboard sailors. Because sailboards are so light and therefore respond so quickly and sensitively to the slightest fluctuation in the speed or direction of the wind, all board sailors know all about the fact that the wind is never steady; they also know how to handle the unsteadiness on a "second-by-second" basis because, otherwise they fall over. What they don't yet know is how to exploit the wind's unsteadiness for extra speed.

The larger group, which is dominant in North America (where there is almost nothing yet which compares without light-weight skiff and dinghy classes) are the sailors of conventional mono-or multi-hull craft. Because all larger boats are necessarily heavy, and therefore have sails and spars of a size which cannot normally be conveniently manipulated continuously and quickly, it has been normal for the crews of these boats not to adjust to brief changes in the wind as they sailed. Instead there has grown the convention of thinking of the wind as it has always been described in sailing books, i.e., as a steady flow.

The third group - the principally Australian crews of the light and sensitive skiffs and dinghies which have become so numerous here, but which even now are seldom found anywhere else - are intermediate between the other two. Because these boats are light in weight and have sails which are either big or powerful or both, they are as sensitive to the wind's subtle fluctuations as a sailboard. And because the rigs of all the advanced boats are, almost without exception, adjustable, their crews have been able to experiment by adjusting as they sailed and are learning from experience what should be adjusted, and by how much, for greatest speed in different conditions.

A summary of the adjustment techniques which appear, at the present time, to be fastest when racing upwind would be:-

(1) As wind speed changes

There are two parts to this:-
(a) Adjust sail's fullness and twist to achieve least wind resistance when sails are trimmed to maintain the desired boat speed through the fluctuation lulls.
(b) During the short-period fluctuation puffs, ease sails slightly and point slightly higher so as to maintain desired boat speed through the puff, (i.e., sail the boat like a sailboard).

(2) As water roughness changes

Adjust sail fullness and twist for least wind resistance when sails are trimmed for desired boat-speed. Note that whenever substantial wave action increases the hull's resistance, and thus substantially greater drive force (power) is required to maintain the desired boat-speed, the trim of the sails in stronger winds will not be the same in (2) as it is in (1).

Figure 1: Laser II sailing on a jib and leech of main with jib sheeted firmly and mainsail eassed to keep boat upright. This commonly-accepted trim for "survival" winds is slow.

Figure 2: Preferable strong-wind trim; main flattened for minimum drag in lulls, jib eased until mainsail backwind just appears in the strongest pulls

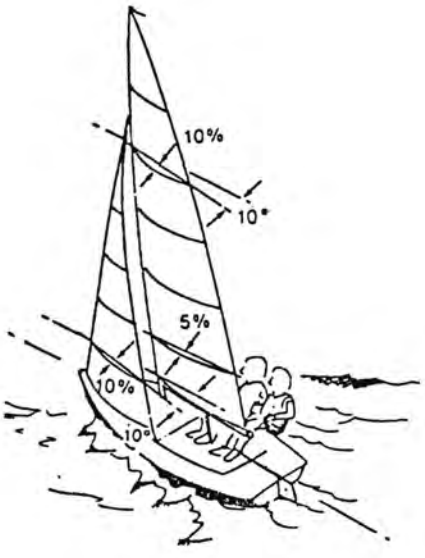


Figure 3: Fastest trim 10 knots flat water. Lower jib 10% to centre line, upper main twisted 10%, lower main flattened to avoid backwind and hooking.

TRIM, TRIM, TRIM – continued

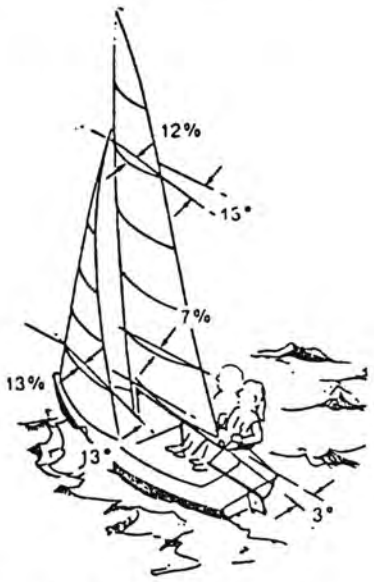


Figure 4: Fastest trim in 10 knot wind. 1-2 foot waves. Extra drive needed so both main jib sheeted 3° wider and set fuller. Leeches still parallel to centre line.

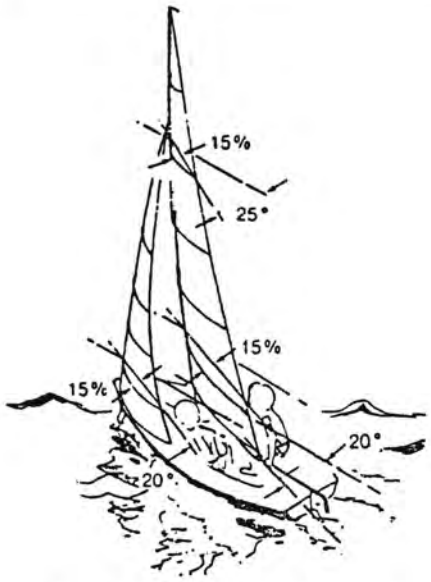


Figure 5: One knot wind, 1-2 foot waves. Rig movement to wave action prevents leeward side flow remaining attached so feeble pressure force only, no suction force.

Figure 6: Fastest trim, 3 knots wind, wave 1-2 foot. Sails everywhere about 15% camber, for maximum possible power, sheeted as wide as necessary, virtually no twist.

(3) As wind roughness changes

Adjust the sails' springiness (elasticity) for least loss of speed at times of abrupt wind speed changes at gust edges.

The following examples will show how these adjustments are employed.

Laser II Canadian Championships, at Kingston, Ontario, About 50 generally young and light crews sailed three races on a Saturday, in winds sometimes 8, but usually 10 to 12 knots. Wave height was a maximum of 2 feet. I noticed that in the stronger winds the majority of crews continued to use normally sheeted jibs, and "spilled power" by easing mainsheet tension, with the result that the mainsails often showed substantial back-wind in the puffs (Fig. 1).

This is a very "high-drag" trim. At a seminar with them that night, I pointed this out, and suggested that they could improve their speed in the stronger winds by a combination of easing jib sheet and sheeting the jib slightly wider (for those whose boats had jib lead travellers) so that no backwind appeared in the mainsail (Fig. 2).

On the Sunday, two further races were sailed in winds of 12 to 16 knots. Several crews thanked me afterwards and reported improved placings in the fleet - the lighter crews in particular were able to improve markedly.

Tasar Canadian Championships at Elbow, Lake Diefenbaker, Saskatchewan. At this two-day, five-race regatta, the maximum wind speed varied between about 7 and 12 knots. The principle feature, however, was a consistent one hour "cycle" in the wind speed, i.e., the wind would blow at, say, 10 knots average for 30 minutes and then at 2 knots average for 30 minutes and then 10 knots again. Lake Diefenbaker averages about 4 miles wide and approaches 100 long, so there is plenty of fetch for wave action to build. As a result, each race would sequence through, not four, but five phases:

(1) Wind say, 10 knots, and flat water. Boats sailed fastest upwind pointing very high, at hull speed (5 knots) through the water, trimmed as in Fig. 3, with jib and upper main about 10% camber, and lower main (behind the jib) 5%, and twist of main 10°.

(2) Wind had been at 10 knots for 20 minutes or so, waves had increased to 18 inches. Boats sailed fastest through waves pointing lower and driven at about 5½ knots and fastest sail trim was about as in Fig. 4 with 13% jib, 12% upper main and 7% lower main. Twist still 10°.

The wind speed then reduced suddenly to about 2 knots average, but blew at about 1 knot mostly, with ephemeral "fingers" at about 3 knots. Waves continued at 18 inches, fortunately they were regular, so:-

(3) In the 1 knot areas, the only way to achieve any movement at all through the waves, was to set the sails full and wide and point as low as necessary to achieve movement (Fig. 5) but . . .

(4) Whenever 3 knots of wind was enjoyed, the boat could be accelerated to about 1½ knots, which provided a useful apparent wind and the boat, after acceleration, could then be "wound up" to maintain its 1½ knots on a close reach with sails set (Fig. 6) at about 15% camber, sheeted as wide as necessary for the speed desired and with virtually no twist.

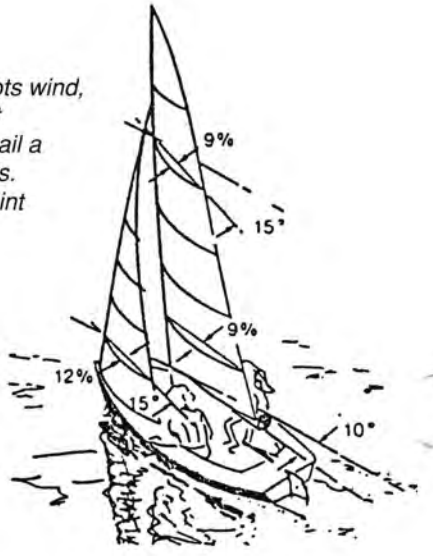


Figure 7: Fastest 2 knots wind, water almost flat. Point progressively higher, sail a little slower, flatten sails. Whenever in doubt, point lower for speed.

TRIM, TRIM, TRIM – continued

(As wind speed increases, three factors combine with almost trigger effect: Wind force increases as the square of wind speed, so 3 knots gives nine times the force of 1 knot. Resultant boat speed further increases wind speed across the sail and at some point, lee flow across the sail adds suction force. The boat begins to move freely on a close-reach heading and can then be "wound up" to a more close-hauled course without loss of speed. In these conditions, always accelerate before winding up, otherwise potential performance cannot be achieved. Use sails as full as necessary and point as low as necessary to provide enough power for the critical boat speed.)

(5) After about 20-25 minutes of virtually no wind, the waves became smaller to the point where more normal light-air techniques were efficient. In the Tasar, in the small waves, these were jib about 12%, mainsail about 9% top and bottom, close reach for boat speed and increased apparent wind, then wind up to point as high as possible while maintaining the achieved speed (Fig. 7). (Not surprisingly, these races were won by those crews who found and exploited the 3 knot "fingers" best. The "prairie sailors" as a group, were better at this than any of their visitors.)

TRIMMING FOR SUCCESS

by ED BAIRD

Reprinted from *Leading Edge.*

We were in Ponce, Puerto Rico, preparing for the Soling Worlds.

It was January, and we had arrived at the Worlds' site three weeks before the event. For a week we sailed alone, until the first of our competitors arrived: Glenn Dexter, Canadian Olympian and former World Champion.

We intended to make an easy snack of Glenn, as we had been sailing so much we felt we must have an advantage. But the very first time we went up together, he blew us off so fast he got bored and went off to sail by himself. It was one of those frustrating days when nothing went right.

Comparing our styles of sailing, there seemed to be one glaring difference in our techniques. We were trimming hard and dumping traveller when the puffs hit. They were keeping the traveller up and easing sheets in the puffs. And, boy were they fast.

Why were they able to go so fast and keep their traveller up so much higher than we could? The big seas and strong winds were pushing us all over the place.

Within minutes of trying the new approach, we became a viable tuning partner again. We used our new skill so effectively that we sailed far above ourselves in the event, finishing sixth in our first World Championship. And our friend, Glenn Dexter, won it. The magic was in how we used our sails to help steer the boat. Very simply, we quit thinking of the sails as only a power source, and started using them as a steering tool as well.

We finally realised we were not letting the boat go forward fast enough. By leaving the traveller up, but twisting the sail more by easing the sheet, the boat was free to move forward easily, with a wider steering groove, and less heeling forces. Initially, we sailed slightly lower than before, but because we were keeping the boat flat and allowing the keel to work better, we were not getting pushed around by the waves and puffs, and we ended up pointing higher over the long term.

If we got a flat spot or the wind dropped, we would trim in two or three inches and ask the boat to point. When a puff or a big wave came, we would ease back and let the boat go forward. We soon learned that this system allowed us to compensate much faster for big changes in the sea or wind, since we were reducing power up high in the sail plan, thus rapidly affecting heel. This made it much easier to steer, as the rudder was not loading up nearly as much, with the boat staying flatter.

Back home we tested with another tuning partner in strong winds and flat seas. Using the same approach, we expected to really move on them. But it was soon clear that they were outpointing us and going the same speed. Now what?

Going back to our old method of trimming harder and using the traveller to depower, we were suddenly faster. As we reflected on the two situations, we realised the difference. In both conditions we were trying to keep the boat on her feet by depowering. But the traveller worked best in smooth water, keeping the sail shape constant while moving the main outboard where it heeled us less. The sheet did more for us in waves, since I was having to steer the boat up, down and around the swells and the twisted shape had less tendency to stall out and/or heel us excessively.

Okay, we really had learned something here. But what were the limits of this twisting technique? Did it work in light air? How about medium winds? We tried a variety of traveller/sheet combinations and found that, as we went from smooth water to rough, the sheets had to go out.

Talking someone into easing the sheet when they are getting tossed around by huge swells and thirty knots of breeze is not too hard. But easing sheets, and I mean the jib as well as the main, when it is blowing six and there is a leftover sea is a lot tougher. But it works.

Any time the boat is bouncing and the skipper is having to steer the boat around waves for best speed, the sails should be twisted more. When the water is smooth, trim a little harder. The big question is, how much?

For the main, put one telltale on the after edge of the top batten pocket. Set the sail up so this telltale flies aft in all but the lightest winds (when it will be hard to get to fly) and you are close to good trim. When the water is smooth and you feel the boatspeed is good, trim a little more and the boat will point. The telltale may be dropping behind the sail occasionally. That is okay, but as soon as you feel the boat slow or feel mushy on the helm, ease that sheet back and get the telltale flying again.

If it is choppy, always, always keep the telltale flying aft. And if the wind is strong with big seas, twist the sail still more, but not so much that the whole top of the sail is luffing.

The top batten is a good reference. In smooth water it should be about parallel to the boom. As the weather gets rougher, let the batten point more outboard.

When in doubt, let it out. Good luck!

BERTRAND ON BOAT SPEED

by JOHN BERTRAND

In this column I'll discuss another use of telltales. In fresh wind conditions I use jib telltales not to tell me if I'm pointed in the right direction when sailing to windward but instead whether I have the correct sail shapes for these conditions. It all stems around the following concept.

Any sail boat has an ideal angle of heel when sailing hard on the wind for a light planing dinghy this is somewhere around 5°, for a displacement dinghy like a Finn perhaps 10°, and for a keelboat it could be up to 28°. In any case, no matter what type of dinghy or yacht, best performance is attained if this so called ideal heel angle is held absolutely constant at all times. It is interesting to note that especially in high performance dinghies the boat that is being sailed steadiest is generally the fastest.

Now assuming we have found this optimum heel angle the trick then is to adjust the sail shapes and therefore the heeling power, so that when the yacht is sailing with jib telltales streaming the boat maintains this particular angle of heel. See Figs. 1, 2 and 3.

Let's assume we are sailing in a 25 m.p.h. wind, in a Soling for example. I would guess that 15° heel angle would be pretty good going to windward. If the mainsail in particular is too full we must "feather" the boat to windward to stop heeling more than 15°. This is indicated by the weather telltales lifting continuously - see Fig. 1. By flattening the main, through bending the mast via backstay and using more boom vang to increase low down bend and open the lower leech area, the rig is very effectively depowered. The jib headstay is also tightened because of increased backstay tension which in turn flattens the jib and further depowers the rig. If we depower too much we find that to maintain this 15° angle of heel we must sail too low, which is indicated by the leeward telltales on the jib lifting. (See Fig. 2.)

When the correct power is obtained in the sails we obtain the ideal condition weather telltales breathing and 15° angle of heel - as indicated in Fig. 1.

So the whole idea is based on angle of heel and in fresh conditions the helmsman should not be using the telltales to indicate his course to windward, but instead whether he needs to depower or power up his rig. His course indicator is in fact heel angle.

In an ocean racer I never look at the telltales - instead I fix my eyes on the horizon and steer the yacht to maintain a constant angle of heel. I then ask the crew about the jib telltales and if they have continuously been lifting then we attempt to flatten the sails. If this is not enough we then depower by reefing the mainsail or changing down in headsail area.

Conversely if the leeward telltales are lifting when sailing a course to achieve the desired heel angle, then we immediately power up the sails. Note that it is always better to have the weather telltales lift a little. while it is very slow to have the leeward telltales lift at all.

When the magic combination of heel angle and sail shape is achieved the boat then starts to find its own groove and so help me it almost feels as if the yacht is sailing on a set of monorails . . . extremely steady with the minimum of rudder action required to keep it sailing high and fast.

You will often see photographs of the champions sailing their boats while maybe looking over their shoulder at the fleet. While they have been looking around their yachts are not being sailed too high or too low but instead they are exactly in the groove at all times. The reason is simply that the angle of heel as transmitted through their backside tells them the course they should steer. When they look forward they don't look at the telltales again, the indicator is the relative angle of the forestay or mast to the horizon; and that angle, as found from many hours of practice, is held exactly constant.

To depower

1. Increase mast bend via backstay. vang and/or removing chocks at the deck level.
2. Move boom to leeward via traveller.
3. Increase Cunningham tension to move draft forward and open the upper leech.
4. Increase outhaul tension to flatten bottom half of mainsail.
5. If sailing a keelboat, use flattening reef or if necessary reef mainsail or change headsets.

SAIL SETTING TECHNIQUES

by MARK BETHWAITE

A prerequisite for setting up Soling sails in any breeze strength is a set of well-positioned wool tufts. The quarter points of the mainsail back are good locations for leach wools, with corresponding mid-chord wools at the quarter points of a line drawn from the headboard to the centre of the foot. On the headsail, I use a number of wools about 3 feet up the luff from the tack and 6 inches from the tape for steering and a half and three-quarter luff height wool for twist setting. Leach wools on the jib are at the third points.

It is recommended that main and jib travellers be calibrated in degrees from the centre line subtended at mast and forestay respectively. In this way, not only will what I am about to say make sense, but also valid comparisons can be made between boats, especially when two boats are tuning. Perhaps the most significant point I wish to make is the difference in set up between smooth and lumpy water. In light airs (up to 5 knots) and smooth water the jib can be sheeted to about 9' with a slightly eased sheet and clew board position selected to give correct twist such that all wools stream over its entire height. The main traveller remains within 2° of the centre line, backstay applied to give a flat (10% depth to chord) shape and the sheet eased to ensure all wools stream. The vang should be slack and foot tension just sufficient to take out wrinkles.

In similar wind conditions with lumpy water, the former settings will be very slow. The boat must be pointed low and sailed for speed with the consequence that the tacking angle may increase from 80° up to 100° or more. The jib traveller is dropped to 11° or more, sheet moved aft on the clew board and eased as before to give optimum twist as indicated by the wools. The main traveller can be hauled up to 3° to windward of the centre line and sheet eased. The backstay tension should allow a considerably fuller mainsail shape, up to 15%.

Under these conditions (indeed most lumpy water conditions) it is not possible to have all wools continuously streaming due to the changes in apparent wind created by the

SAIL SETTING TECHNIQUES – continued

fore and aft pitching of the mast head. Other than in long period waves, then sheets can be adjusted on a wave by wave basis, a compromise on wool streaming must be sought and that the sheet tension, traveller position and backstay combination give the best "feel". Again, the vang should be slack, but the foot tension eased to fill up the foot area more than in flat water.

The ball game changes with an increase in wind velocity up to about 12-14 knots, at which stage both crew will be over the side. In flat water where high pointing can be achieved, the jib traveller can come in as close as 7.5°, and be sheeted more tightly as the breeze increases, with consequent clew board adjustment forward, again all as dictated by the wools. The main is sheeted on the centre line, block to block (mast raked to suit) and trimmed flat with the backstay. Some vang may be beneficial to flatten the lower half of the main and thus reduce backwind resulting from the close jib sheeting angle. The foot tension should be firm for the same reason.

For similar wind and lumpy water, I would suggest 9° with the jib and 2° with the main traveller with again a considerably fuller mainsail camber. As with lighter wind, not all wools will stream all the time end a compromise must be sought. The vang should not be used until the boat becomes overpowered and the foot tension should be only moderate in order to retain drive in the lower half of the mainsail .

As the breeze increases still further, the importance of wool tufts diminishes, and the boat will TELL you in no uncertain terms what is required. The general rule of flatter sails for flatter water is still valid but sheeting angles may be reversed, i.e., closer in lumpy water then flat with sheets eased more then in flat water. Lack of power to punch through waves should be corrected by less twisted settings of main and jib, lack of gust response (acceleration) by more twist to open the slot and reduce weather helm. Increasing vang tension also will assist gust response as will the playing of both main and jib travellers. Foot tension, of course, should be maximum.

Having said all that, which is not exactly original, several other points need to be made. I think that, in general, a "flat" main should be used in lumpy water up to at least 15 knots to keep movement and "life" in the rig, so that the rig responds to the movement of the boat through the waves. Other than in light air, a full main is fine for all flat water sailing and is best for all sailing over 15 knots.

Weight positioning in the boat, both fore and aft and sideways is important in light to moderate air to maintain an optimum angle of heel and to keep the weight of the crew concentrated over the keel, to reduce resistance to pitching whilst also lifting the broad rear sections somewhat.

Once the boat is set up well and all other factors are equal (are they ever?) the most important single determinant of boat speed, particularly in lumpy water, is steering. This is a technique which can't be quantified as can be sail settings, etc., but the only advice I can give is to try and achieve some empathy with the boat - try and sense its reaction to meeting the next wave higher or lower, faster or slower, heeled more or heeled less. Thus steering and sail trimming are inter-reactive; each should influence the other until not only does the boat feel right but it is faster then the competition.

Above all else, the most important thing to do is to go out and practice, a philosophy I can preach but not practice at present with my boat in Sydney and myself in Melbourne. Speed, boat-handling and crew-work all improve with practice - it is the only way to approach a major regatta if you are at all serious about doing well.

SOLING TRIM

by DAVE CURTIS

Reprinted from *American Sailor*, July 1991.

We need to make sure the boat is set up properly. Mast rake is checked by measuring the amount the forestay length exceeds the mast length. Hold your forestay along the front of the mast and simply mark the forestay at the point where the surface of the deck would be. If the forestay is shorter than the mast, the mark will be on the pennant. We check our rake by measuring the distance from this mark to where the forestay intersects with the deck. The standard rake setting is 28"-30" We use this setting for all conditions.

Our spreaders extend straight out from the mast, with no forward sweep. We have five settings for the fore and aft location of the shrouds at the deck, with a total travel of 1/2" Even though we use separate tracks for the uppers and lowers, the cars move together.

0.3 knots	Full Forward
4-8	Aft 3"
9-12	Aft 6" (mid-track)
13-15	Aft 9"
16+	Full aft

Our shroud tension is measured with the shrouds in the middle location and the forestay and backstay totally slack: Uppers - 600 lbs. in all conditions: Lowers - ½" sag at spreader for light air, increasing tension to 600 lbs. at 18 knots and 800 lbs. above 22 knots. Our lower shroud tracks are ramped ½" steeper than the uppers to give relatively more tension to the lowers as both shrouds are moved aft.

Sail Trim and Rig Adjustment

Up to seven knots, trim the mainsheet hard enough to make the top batten parallel to centreline. In smooth water and high pointing conditions, trim harder to cock the batten slightly to weather. In choppy conditions, the batten must twist off slightly. As the breeze picks up, you will find it necessary to use quite a bit of mainsheet tension to keep the top batten from falling off. This mainsheet tension when combined with the backstay, should be enough to keep the forestay under control.

In light air, the boom should be set 4" above centreline. Above eight knots, drop the traveller enough to keep helm and heeling under control. As the breeze increases, we find best results by increasing mast bend and twist instead of lowering the main traveller.

Backstay: There are two things the backstay does: Controls fullness in the main and forestay sag. This is probably the most important adjustment in the Soling. The more backstay tension the flatter the main, and the reduced forestay sag flattens the jib. I have my backstay marked at every two inches so I can repeat fast settings and have the boat ready quickly after mark roundings.

Mainsheet tension: The mainsheet controls the top part of the mainsail. The quickest and most accurate way to trim the mainsail is to watch the top batten sighting from under the boom; the top batten should be parallel to the boom most of the time. Under ideal conditions (flat water), the top batten can point 5° to weather of centreline, and when overpowered, it should open from centreline until it balances the helm.

Boom Vang: Our sails are designed so it is only necessary to use vang in a few situations. For upwind sailing, I use only enough vang to keep the mast from pumping, except in heavy air, when I occasionally use vang to reduce helm.

Traveller: The boom should be above centreline until both crew are over the side, then the traveller should be eased down to reduce weather helm. The traveller should be played with each puff in over 14 knots, but if the wind is steady, the backstay should be adjusted to depower the top of the mainsail and the traveller kept in the middle. Maximum out should be about 10" in 15-20 knots.

Jib Trim: For top performance in Solings, proper jib trim is paramount. The first thing to do is make sure you have a leech telltale at the top batten. Trim the jib so this telltale is always streaming straight back. If it starts to drop or wrap around the leech, ease the jib sheet a little

For proper jib luff tension, keep slight wrinkles in the luff. Once both of your crew are mini-hiking, tension the luff more to remove most of the wrinkles.

For Solings with a self-tacking jib traveller system, I suggest placing reference marks on the aft side of the splash rail. Put these on each side of the boat at 10 inches off the centreline. Then sail with the jib sheet crossing this mark, except in very light or heavy air.

The proper amount of headstay sag is about 5 inches. I use the fore and aft adjustable shroud tracks and backstay tension to control the amount of sag. If you do all of these things correctly, the jib will contribute greatly to your overall speed and pointing.

One of the first steps toward optimising windward performance in a Soling is to maintain the proper crew positions for both heel and reduction of pitching moment. In extremely light air, one crew should be on the leeward deck with the skipper and the other crew sitting on the leeward floor. As the breeze increases you always want to keep the angle of heel between five and ten degrees while at the same time keeping crew weight as low as possible, especially in chop. It is more efficient to keep one crew on the leeward floor if it enables the other crew to hike fully.

As a general rule, I usually keep the main trimmed firmly until I need to depower. The jib trim is more open, with the top batten telltale always flowing. I keep the boom to windward as much as six inches until both crew are dropped, at which time the boom is centred.

If you start with the jib tack about 3-3'9" above the deck in light air, progressive halyard and luff tape stretch will put the tack on the deck at about 15-18 knots. I usually start out with about 30" of rake, measured along the forestay, and unless the helm becomes too heavy as the wind increases, I prefer not to reduce rake.

When reaching with the spinnaker, always keep the spinnaker pole away from the forestay more than you think is right (never closer than one foot). For proper, heavy air close reaching, the forward crew should use both arms to pump the guy - twice - on the waves. Don't forget that unlimited pumping is legal to prevent a broach, and I don't mean timid pumps either!

REACHING

THE REACH TO REACH JIBE

I remember being impressed by the relative violence applied by Rod Davis and Eddie Trevelyan (1984 Gold Medalists) to reach jibing (demonstrated in their description and in the video of their action - "Soling Sailing", June 1984) and have now learned for myself that violence is required - particularly in a breeze. The problem of most crews is a combination of a lack of co-ordination and of a tentative manipulation of the pole. The risk is that the spinnaker temporarily freed of the constraint of attachment to a pole will oscillate excessively taking boat and crew, willy-nilly, with it. To avoid this the sail must be kept choked-in, flattened across the forestay during the jibe and its pole re-attached at the new tack as soon as possible.

Twings facilitate this process by minimising the lifting of the new guy (and of the old guy) during the process but Rod and Eddie showed that they were not necessary. Eddie set the new guy in its cleat (at a designated mark) and with one foot, braced against the cockpit coaming, yanked the new sheet aft as Rod removed the pole. With the pole off, the sail was square across the bow of the boat, both leeches flattened, its foot stretched over the forestay. The tension across the foot of the sail kept the sail from rising up and its flatness prevented the development of any laterally directed forces which would induce oscillations. The helmsman could turn the boat as little or as much as he wished and the new guy would stay in its proper place until its pole was attached.

I now note that my middle man, leaping into the boat from his fully hiked position growls as he grabs the tail of the old guy and violently hauls it aft - and that the violence of his action, flattening the sail quickly, goes a long way to assuring the success of the procedure. In my boat, I (as helmsman) reach below the mainsheet to grab the old sheet/new guy from the trimmer and I ease it out. Having relinquished the sheet, the foredeck man trims in the leeward twing (within 3 feet of the deck) releases the windward twing, and then leaps onto the deck to detach the pole from the mast. After the middle man completes his violent pull on the old guy, the foredeck man has detached the pole from the mast and the sail, and I have eased the old sheet to square the sail, everyone pauses awaiting my command to proceed. This permits me to adjust the course and the timing of the actual jibe to the mark and the surrounding boats. On "Go", the boat is turned, the foredeck man reaches with his left hand (marks to port) for the new guy and the boom is thrown across. The twing, the middle man's elbow (or bottom) and my restraint keep the guy within easy reach. The foredeck man slides his right hand along the pole and opens the latch with his thumb. As soon as he has pressed the guy into the end fitting with his left hand, he uses it to bash the pole (the second element of violence) as rapidly and forcefully as possible, against the tack of the spinnaker. This not only helps to keep the spinnaker spread flat (and docile), but keeps the inboard end of the pole in the same horizontal plane with the mast ring and, as I ease the guy foreward, greatly facilitates its reattachment. So violence not only keeps the sail itself flattened and controlled but obviates the familiar dance in which the foredeck man straddles the vertical pole and attempts either to climb or spear himself with it. With the pole reattached (again a violent bash upwards is facilitating) and the sheet progressively trimmed (by the middle man), the boat is brought on course.

THE REACH TO REACH JIBE

by ROD DAVIS and ED TREVELYAN

Rod: We're going to explain how we jibe in a wind speed of 15 knots. We are coming into the reaching mark with a sheet over the boom. We don't use tweakers because we're afraid they'll get caught on something during the jibe. At 15 knots Eddy plays the vang and I've got the spinnaker sheet and we're both . . .

Ed: We both try to hike as long as possible. I ease the vang so that when the jibe is completed the boat is not in danger of spinning out.

Rod: At the last second I hand the spinnaker sheet to Eddy, unhook, and step up to the spinnaker pole. It's important for the forward man to get up in position very quickly. I like to be on leeward side facing forward wedged between the shroud and the mast. You want to get into this position at the very last second and while the boat is actually turning because your weight on the leeward side . . .

Ed: Now as Rod steps up on the foredeck, I begin to square the guy . . . I also ease the sheet to a point where the leeward clew is maybe a foot or two past the shrouds (then cleat it). I square the guy as hard as I can by facing with my back to the mainsail and bracing my foot up on the weather combing and pulling with both hands on the guy. This squares the guy all the way back to the shrouds, in effect stretching the foot of the chute across the headstay and sort of choking the spinnaker. This keeps the new guy, which is still on the leeward side, from skying up in the air and helps Rod to reach it.

Rod: I unhook the pole at both ends at the same time (off the mast *and* the spinnaker sheet) just as I 'm reaching for the guy, the trip line on our pole is continuous so you can do that with one hand. Once you get the pole on the new guy quickness is very important. You need to push the pole out as fast as possible because you have the lee of the mainsail to help you and soon the main will be across and that advantage will be gone.

Ed: Sometimes when Rod is reaching for the new guy and I haven't squared the pole enough, the chute will tend to sky up into the air and the new guy will be out of Rod's reach. In this situation, Rod will yell to me and I will jump up and grab the guy for him and maybe Robbie will also help. When Rod gets the pole hooked to the new guy, I start easing the new guy forward but only as much as he needs. I want to let it forward synchronously, as he pushes the pole out. I will give him just as much pole as he needs but not too much.

If the clew of the spinnaker gets to the headstay prematurely, this will tend to put too much load on the pole and it will hinder Rod's attempt to get it on the mast . . .

Rod: There are times that you have to make a slam jibe. You're suddenly on a beam reach and the pole hasn't gotten to the mast. It's very important here to brace your back against the mast and use your shoulders to push the pole out instead of trying to use your arms. You have a lot more power there. Our pole ring is a little bit lower than most of the others and this helps me because I can use my shoulders better.

Ed: If in the case of a slam jibe Rod is unable to hook the pole onto the mast (after struggling for a few seconds) it's best to collapse the spinnaker and to allow Rod to quickly hook the pole on the mast. Then I can re-trim the spinnaker rather than having Rod struggle on the foredeck while the boat heels excessively.

Rod: Once the pole is on the mast quickness is again impor-tant. I step down into hiking straps (the old style with just a strap going across) which I can step into and hike immediately without having to hook up. Then the spinnaker sheet is transferred from Eddy to me and Eddy starts playing the vang again. The two jobs require a little bit of different skills. The forward man just has to be quick. Quickness is a lot better than strength because if he gets up and does his job and gets it right down and there won't be any problems. For the middle man it's a combination of strength and co-ordination watching the forward guy do his job and helping him out like easing the guy when he's pushing the pole out. A normal jibe when things go right takes about four seconds. When they go wrong, oh, about 25 minutes.

Robbie: Stuart, I hope this is what you wanted. The information that you just got from Eddy and Rod has come from 2 years of practising and trying to perfect all the manoeuvrers. The one thing I suggest to people that want to get better in their spinnaker work is practice and that's what we've done by setting marks up, setting up short courses and trying to get the crew work down which we feel is vital.

Gold Medal Speed.

At North, we're proud of the fact that our Soling sails have won the past three Olympic Gold medals. And more World and Continental championships than any other sailmaker. But big victories are only part of the story.

Every week we help Soling sailors all over the world reach the top of the fleet in everything from club championships to world championships. Just recently, our customers' record has included:

World Championships, 1st, '91, 90. Europeans, 1st '91.
Olympics, Gold Medal, '88, '84, '80.

With North Sails you get more than speed out of the bag. We give you friendly, expert service from Soling sailors who are dedicated to helping you win. Let our team put your team on top! Contact your local North loft today.

Number One in One-Design.

NORTH SAILS

North Sails One-Design
1111 Anchorage Lane
San Diego, CA 92106
619-226-1415; FAX 619-224-7018
Vince Brun, Chris Snow

North Sails Marblehead
16 Lincoln Ave.nue
Marblehead, MA 01945
617-631-5147; FAX 617-639-2461
Dave Curtis, Steve Ulian, Jim Brady

North Sails Germany
Seeshaupter Str. 60
D-8122 Penzberg, Germany
(498) 856-9150 • Fax (498) 856-1601
Albert Schweizer

RUNNING

DOWNWIND CONSIDERATIONS

by SAM MERRICK

Over the past several years the Soling Class has promoted the importance of the traditional "run" downward either by eliminating the reaches entirely in light air or by swapping the run for the reaches after the first beat in the Olympic choreography.

Time was when the beat to windward was the major topic of every book on sailing. The reach got some attention, but the run was neglected except for ice boats, catamarans and scows. You got to the windward mark, scrambled getting the spinnakers set, then broke out the sandwiches and relaxed. Just steering to the leeward mark was sufficient Although this is somewhat of an exaggeration, many sailors today, not exposed to VMG calculations, approach the run with little appreciation for the great gains available to them. They have skillfully applied their knowledge and experience on the beat, staying in phase, searching for more wind in the darker water and keeping a healthy distance from laylines. Having attained the windward mark, their attentions are apparently aimed toward getting downwind, in the general direction of the leeward mark, with enough deviation from the rhumb line to keep the spinnaker full (at least the visible pan of it)! Only a converging right of way competitor or an overtaking (wind taking) boat might change such an unimaginative course. However, there are a myriad of other considerations that will increase interest as well as racing performance on these downwind legs. Let's break out for close analysis only the principal elements necessary for successful downwind sailing.

1. *Get away from "traffic,"* not only those who are close astern disturbing your air, but those just ahead. If you are going to make gains with the techniques described here you are going to need manoeuvring room. A clearing hitch upwind has the equivalent effect downwind. Avoid luffing matches which can only lock you in to the calculations others are making and can take you quickly out of your own game plan. Timing your jibe away from traffic is crucial. A momentary wind shift or a distraction on a competitor's boat are both good opportunities for making your move.

2. *Go for darker water.* Wind comes in gusts and follows channels. You stay in the gust longer going downwind that you do upwind, because the boat's speed is added to the gust duration rather than subtracted as it is upwind. It is therefore a more significant influence on the boat's speed. You must take special steps to get your heads out of the boat to see the gusts. Looking ahead is so natural, but is really more useful going upwind. A good crew who knows that looking backwards downwind is more useful than looking ahead can be a great asset. The skipper should sit sideways downwind, so that by turning their head ninety degrees they can take in the whole panorama or the wind on the water. Steering the boat in the path of the gust gains places.

3. *Get on the jibe* (in the racing rules it's called tack) *which is appropriate for the wind direction.* Going upwind we are accustomed to tacking on headers and staying on lifts whereas downwind we must stay on headers (and steer down) and jibe on lifts. Elementary you might say. But the difficulty is in being able to identify exact wind direction and detecting wind shifts, a process that is immediately apparent upwind, but not down, especially in the lighter wind ranges. Speed loss can be felt and if it is not the result of less velocity, it is probably a windshift, a lift "Freshening." or heading higher (it will show on the compass) is one response, or a jibing (if the shift is confirmed) is another. All those telltales you've put everywhere on the rigging should be of great assistance if you've learned how to read them, not an easy task. Personally, I find a masthead indicator, with two references points of greater value in detecting those shifts.

4. *Develop a sense of lay-lines.* The location of lay-lines (and frequent relocation) for downwind calculations is affected not only by wind direction shifts, but by changes in wind velocity as well. For example: In a wind of five knots, you will get to the leeward mark soonest if you steer a course (let's guess) thirty-five degrees away from the rhumb line, assuming wind and rhumb line are aligned. As the wind increases, you can head lower so as to be able to reduce that angle to twenty-five or so. Thus, in the absence of wind direction change, the lay-line (another way of describing the ideal heading for a mark) will relocate itself. Contrast this with the simplicity of lay-line calculations going upwind. Except for the loss of a few degrees at the extremes of wind velocity or chop, the lay-line is a predictable angle to the wind's direction represented by the boat's tacking angle, whether the wind velocity is three or eighteen knots. The significance of downwind lay-lines needs no emphasis if you understand their upwind impact. Going past them is traveling extra distance. Going close, except near the mark, runs the risk that a windshift will relocate the lay-line with you outside, so you've already wasted distance compared to the boat positioning itself so as to remain within the lay-line cone.

5. *Sail enough so your boat communicates* its most efficient angle to the wind (VMG) in various wind strengths. Boats with instruments develop tables for this purpose. For those of us in small boats, seat of the pants feel is our only resource, a product of sailing experience. The different behaviour of Scows and Solings illustrates the point. A Soling, in eighteen knots of wind, with its keel, is in the grip of drag forces which will not let it exceed its directly downwind speed, will go no faster if headed at a different angle to the wind. However, as the wind drops below ten knots and less, the speed will significantly increase (enough to compensate for the additional distance traveled) as the wind's angle of attack becomes less. By three knots, it may be as little as fifty degrees (that is jibing angles of one hundred degrees). On the other hand the Scow (like an ice boat) will be slow dead downwind, even in eighteen knots. But freshen it fifteen degrees and there will be a huge speed increase immediately. The response challenge lies principally in the wind range between five and fifteen knots, in velocity, variations of two or three knots, conditions characteristic of most of our small boat racing. The key question (assuming no change in wind direction) is where to head the boat as the wind increases or decreases; how much more toward the leeward mark should the boat be headed to take advantage of a slight increase in velocity, and conversely, how much higher in decrease. You won't get answers to such questions on shore, you have to "feel" them. If you inject a wind shift into this illustration, it is easy to see why an onboard computer could be helpful. You can bet that computers were working hard, on both boats, in that 1983 America's Cup Race when Australia made up 57 seconds and passed Liberty on the run of the last race of the series.

DOWNWIND CONSIDERATIONS – continued

6. *Perfect jibing technique* goes hand in hand with the application of these perceptions. Ideally, the spinnaker should remain full throughout the jibing manoeuvre, and the boat rounding to a wind angle that is appropriate to wind velocity and direction. There should be no reluctance, no feeling that it's a "big deal" to make a jibe, whether in the middle of a leg or near the leeward mark. The last point warrants very special emphasis. "Near the leeward mark" means within 200 feet, where it's tempting to head for the mark even though that's straight downwind and *very* slow.

COMMENTS BY STU WALKER

Sam is the past master at sailing downwind—so pay attention. I can't help but feel that there is a little missing, however—he doesn't explain why he's always where the gust will be before it appears, away from the next shift before it occurs. In addition, use the compass. Before the start (revise as you go) record the headings for the rhumb line to the leeward mark, the median downwind direction, and 20' either side of that median downwind direction to represent the approximate sailing directions on each jibe. Before you reach the weather mark consider the shift pattern to determine the initially preferable jibe, i.e.: the one which better approximates the rhumb line at the more headed sailing angle.

Start the run on that jibe or, if in doubt, check the compass and the recorded data as soon as you round and jibe if necessary. Start the run free of traffic, if possible, but if one jibe is 40' off and the other on the rhumb line, there's no choice. In oscillating shifts, just as if sailing to windward, it's better to be in dirty air on the right (headed) jibe than in clear air on the wrong (lifted). And thereafter, use the compass. Have someone call it periodically. In a shift, with the pole in the same place, to keep the spinnaker similarly full, the heading will change and the compass will show it. When the other jibe better approximates the rhumb line (compare the recorded headings and estimate your expected sailing angle), jibe.

THE LIGHT AIR JIBE

by STU WALKER

The run may be the most important leg of the course in light air with variations in boat speed and distance sailed comparable to the beat. The boat must be kept sailing at a high angle to the apparent wind, often as high as 45° above the dead downwind direction. This maintains speed, which is difficult to reacquire in light air, keeps spinnaker from collapsing, which is difficult to re-fill in light air, and most importantly, results in the maximum rate of progress to leeward. The course must be constantly varied to assure that the best coordination of speed attained and distance sailed is maintained. The boat is borne away as the wind increases or shifts forward and headed up as the wind decreases or shifts aft. The optimal angle to the apparent wind depends upon the boat, the feel of speed and a certain amount of sixth sense which Sam Merrick sums up as "ventilating the rig". The minimum restrictions are: never bear away so far that the spinnaker collapses (or assumes a J-shaped configuration at the pole) and never head up higher then necessary to keep the boat feeling "fast".

In order to maintain this ideal speed in the direction that is most directly downwind, the boat must be jibed frequently in the many shifts which characterise light air. It should be jibed whenever it is lifted sufficiently so that a course equally high on the wind, but more directly "downwind", towards the leeward mark, can be achieved on the opposite jibe. It may also be jibed beneficially when the course on the opposite jibe can be maintained at an approximately equal deviation from the median downwind course, but within a zone or streak of better wind.

The desiderata of the jibe are that it be completed without losing speed and without collapsing the spinnaker. If this is possible, the helmsmen gains a tremendous advantage, becoming able to jibe whenever he wishes and to take advantage of even slight alterations in wind direction or velocity. As turning the boat away from the wind necessarily causes slowing, the jibe should be completed as rapidly as possible. As the boat turns the apparent wind shifts ahead and to leeward - opposite to the direction of the swinging bow. Then, as the turn begins, the original leech of the spinnaker becomes its leading edge and the apparent wind shifts throughout the turn to abeam to leeward, perpendicular to the turn. To accommodate this change in the apparent wind, the spinnaker must be shifted rapidly into a close reaching set on the opposite jibe and maintained in this position until the turn is completed. (Thereafter, the guy can be gradually trimmed aft until the sail is optimally set for the course to be sailed.) This rapid shift of the spinnaker must be achieved without collapsing the sail. Its collapse will result in the loss of at least a boat's length compared with a boat that does not jibe or jibes without collapsing its spinnaker.

THE LIGHT AIR JIBE – continued

To achieve this effect the foredeck man must detach the pole from the sail at the instant the turn is initiated, attach it to the new guy as soon as possible, and push the pole forward to aid in re-orienting the sail to the new apparent wind. The foredeck man can greatly aid the sail trim by judicious manipulation of the pole and should not attach it to the mast until he is certain that the sail is full and stabilised. The sheet man meanwhile has to free the old sheet, feeding it forward, as he rapidly trims the old guy. He must be able to see the spinnaker continuously during the jibe and should keep his eyes on it while manipulating the lines. His duties are aided by light sheets and freely turning blocks. The helmsmen should be responsible for bringing the boom across slowly, holding it in the midline until the boat is nearly up to its new course, and then easing it out - so as not to disturb the spinnaker. Quick repeated jibes in small boats may sometimes be best managed by the helmsman taking the sheets directly as they come free from the sail and the middle man managing the boom. This is advantageous because the helmsman being farther aft, is in a better position to trim the sail in line with its intended leads and by taking the sheets directly he eliminates the friction of the blocks.

Once the technique has been acquired and the crew well trained in its application, the helmsman is free to exploit the conditions of the light air run. Properly conducted the jibe may even gain speed by producing an artificially increased apparent wind during every turn and by the rapid trimming in of the mainsail as the jibe is initiated (although this results in a transient increase in forward thrust, it must not be exploited to the point of disturbing the spinnaker).

SAM MERRICK comments

For an ice boat sailor, heading directly downwind to the leeward mark would chain him to the wind speed. Yet speeds well over 50 are attained in 10 m.p.h. air by turning the "run" into a pair of reaches separated by a 90° turn at a jibe (no jibe mark, in an ice boat race). The ice boat typically heads "45° above the dead downwind direction" and does so with a tightly trimmed mainsheet (as though it were going upwind). Unlike a sailboat with its drag from moving through the water, the near frictionless runners on ice allow very substantial increases in apparent wind as the boat itself moves across the ice.

Perhaps the ice boat analogy will help the thinking sailor become aware of the reason for "freshening" as the wind gets lighter—that is, heading higher or further away from the "dead downwind direction". I make the point because it seems to be one of the most difficult of concepts to learn and practice. Many sailors who have heard the message will head high enough to fill their spinnaker, but not high enough to increase the apparent wind. It seems to stick in their craw to have the spinnaker pole on the headstay on the downwind leg as though they were on a reach - which is of course is what they are.

THE SPINNAKER TAKEDOWN

by JOE HOEKSEMA

Since the spinnaker in heavy air has always been a tough problem for the average club racer, we would like to suggest an easy solution - take it down. However, getting the spinnaker down quickly and efficiently at the leeward mark in heavy air requires a stuffed bag of tricks and we would like to detail the techniques we have employed.

The leeward takedown

We used the leeward takedown almost exclusively when we first got into the Soling class, but soon found it inadequate. It is carried out by having one crew go to leeward (not the place to be in heavy air) and grab the spinnaker sheet. On a reach, where the spinnaker sheet is riding above the boom, this requires the use of those, as Sam Merrick calls them, "diabolical lines called tweakers". The helmsman then bears off to collapse the spinnaker in the backwind of the mainsail, often giving up that inside berth at the leeward mark. The crew then releases the guy and takes down the chute behind the main.

The windward takedown

A technique which solves the above problems and gets the spinnaker leads in position for the next set is the weather takedown. First, the pole is removed from the mast and guy and stored. In most conditions one can continue to trim the chute by pulling down on the guy to keep the spinnaker tack from riding up the forestay. The sheet is then released and the foot is pulled to weather around the forestay. When the foot is controlled the halyard is released and the spinnaker is dropped.

The halyard takedown

There are times when a leeward takedown is advantageous such as a tight reach when the next set will be the same gybe, or when a spinnaker must be changed. The crew simply lets the halyard run (it must run free) and then collects the sail from the foot once the boat is upright. This is a good technique for retrieving the chute when the boat is knocked down with a severe broach or in very heavy air because the sail gets down and out of the wind before the guy is released.

You've seen these techniques detailed already in issues of the *Leading Edge*, and we naively assumed this was all there was to know about spinnaker takedowns. But, after considerable discussion with fellow sailors we realised there was more to be learned.

The hull takedown

Terry (a.k.a. Mad Dog) Bowman, with crew Dave Schmidt and Bob Folay perfected this technique in the 1978 Wilmette Race Weekend. While sailing at the front of the fleet and approaching the last leeward mark they demonstrated the manoeuvre flawlessly. The hull takedown is achieved by prematurely releasing the halyard while the boat is sailing dead downwind. The crew must then ignore the halyard and continue to trim the sheet and guy so that the spinnaker falls in the water directly ahead of the boat. (It is also advantageous for the skipper to be looking aft at this point so as not to altar course to windward or leeward of the spinnaker as it hits the water.) The beauty of this takedown is that the boat does the rest as the spinnaker entangles on the keel. This is an excellent technique for slowing the boat when you've established a late inside overlap after the two boatlength circle.

The shredder takedown

This takedown can be carried out either to weather or to leeward. After controlling the sheet and guy, the spinnaker is dragged down across the sheer edges of the spreader tearing large ventilating holes in the Dacron. This allows the spinnaker to "breathe", and prevents the chute from inadvertently refilling which would spoil the perfect takedown. One way of consistently achieving a good shredder takedown is to takedown to leeward aft of the shrouds while the mainsheet is fully eased. The mainsail will then pin the spinnaker between itself and the shrouds and spreader. To fully appreciate the beauty of a shredder takedown a brand new chute must be used.

The leave it up takedown

This manoeuvre was well demonstrated last season in our local fleet by Phil Dowd (although he used his jib instead of the spinnaker the technique is essentially the same). After completing a heavy weather race the jib halyard would not release. Phil quickly solved the problem by releasing the jib sheet and tack, unhanking the jib from the forestay and sailing into the mooring with the jib flying from the halyard. When the spinnaker is used for the leave it up takedown it makes a colourful mast-head wind vane for the next beat (although some members of our fleet report that it reacts sluggishly to minor, light air wind shifts).

The hack-down takedown

The writers of this article first attempted the hack-down takedown on US25 during the 1978 McNulty Cup in Milwaukee. It was blowing a steady 55 knots out of the west. (The race committee anemometer recorded only 30 knots but we knew better.) After four hair-raising legs we felt the wind had eased to slightly below 50 knots and so the skipper called for a chute. "Bang" - up it want! "Bang" - we immediately broached. the cockpit filled. It was obviously time for the hack-down takedown. On command the crew released the guy and halyard which immediately paid out to the knots at the end of the lines. We marvelled at how well the chute stayed full, flying 45 feet from the boat with no one trimming the sheet. All that remained was to hack through the spinnaker guy with a sharp boat-swain's knife to retrieve the chute from the stern. We now carry large wire cutters to expedite cutting through our new Kevlar spinnaker sheets.

The *big boat* takedown

On a *big boat* (you know - *Sorc, Mac, Admiral's Cup, Off Shore)* when the spinnaker has to be doused the skipper looks to port of the Loran, just aft of the Speedo, behind the AWI, and next to the Digital Computer Course Read Out. There lies a switch labelled "Spinnaker Takedown".

LIGHT AIR SPINNAKER TRIM

by STU WALKER

As the spinnaker may not be usable on a tight reach in light air (the apparent wind is shifted further forward - boat speed relatively high compared to wind speed) and it may only be set on a broad reach or run, a full sail is desirable. The fuller the sail the more stable it becomes, the more easily it fills, the less readily it collapses. (Energy expended in re-expanding a spinnaker is energy lost.) The light air sheets should be rigged and, if an option exists, they should be led from leads 3-5 feet forward of the transom. The pole should be set low on the mast so that the luff will be full initially and the sail more inclined to fill as it is set.

The critical element in setting in light air (any air?) is to initiate flow on the leeward surface of the luff. This means that, as the sail goes up, the sheet must be fully released and the guy overtrimmed. Once the luff is obviously aback, the pole can be eased forward until the leading edge fills. Then from a luffing state the sheet is trimmed until the entire sail fills. Three factors aid this result:
(1) the boat is borne away gradually and, even if the leg is a run, not headed below a broad reach until the spinnaker is filled;
(2) the jib sheet is released as the mark is rounded (a stalled jib will prevent the spinnaker from ever filling);
(3) a twing is rigged to prevent the pole from coming back without the spinnaker tack.

As soon as the spinnaker is filled the boat can be brought to its ideal course, the jib can be dropped (preferably without scrambling onto the foredeck), and the mast pulled forward - raked forward of vertical (not to achieve balance as in heavy air, but to get the spinnaker away from the main). The mainsail should be set full (outhaul and Cunningham eased, mast straight, vang tight) and the boom trimmed at a closer than usual angle of attack (the apparent wind is always shifted forward in light air and the downwind course must be relatively high on the wind). Readjust the pole height as necessary to keep the tack at the same height as the clew (better too low, to keep the luff full, than too high in very light air).

Trim on the run is based upon two principles:
(1) the helmsman can maintain spinnaker trim better by altering course than the sheet man can by trimming the sheet and:
(2) as the helmsman wishes to alter the course continuously he must lead the way and the sheet trimmer must follow.

With a minor decrease in wind strength or the slightest sagging of the spinnaker luff, the boat can be headed up until the sail lifts in its entirety. With a minor increase in wind strength, the beginning of a folding of the luff, the boat can be headed off, to gain position farther to leeward. The sheet trimmer must follow the boat's lead.

With a greater decrease in wind strength, the pole may have to be eased farther forward (so the boat can sail higher) or even dropped to a lower level. With a greater increase in wind strength the opposite adjustments may be indicated, so that the boat can be taken down as far as possible in the gust. In addition to responding to changes in wind velocity, the helmsman will respond to changes in wind direction, following the wind, maintaining the same sailing angle (until a major lift that requires a jibe occurs). The boat is continuously sailed high enough, but no higher than is necessary, to keep the air flow attached to the leeward surface of the luff of the spinnaker (so that the luff at least is unstalled). Only in moderate to heavy air can the spinnaker be sailed completely at the stall.

The angle of the pole to the centre line rarely needs adjustment while running. It is better to leave it alone and sail the boat so as to keep it at the proper angle to the wind. Then compass headings indicate wind shifts and the appropriateness of a given jibe. In general the higher on the wind the boat is sailed and the stronger the wind the higher the pole can be set. It should always be set approximately perpendicular to the mast but a 15° variation from the horizontal is acceptable.

JIBING AT THE WEATHER MARK

Technique often determines tactics. The timid may avoid two extra jibes, which might attain an inside overlap, because their jibing techniques are inadequate. The daring may attempt two extra jibes, perform them poorly, fail to attain an overlap, and lose an additional outside boat in the process. It is usually better to attempt less, to settle for the present status, rather than to risk disaster attempting the ideal. Nowhere is this principle more pertinent than at a weather mark in light air when a jibe is indicated. If one is able to turn rapidly downwind and jibe while preserving speed and retaining a full spinnaker, then it will pay to turn inside the boat ahead or away from the course of the boat astern and to jibe immediately. However, if, in the attempt, the spinnaker will foul the forestay and become completely blanketed by the stalled jib and main and the boat will lose all the speed it carried around the mark, one's opponents, with their speed preserved and their spinnakers full, will soon circle around and disappear ahead.

The risk of disaster in jibing is directly proportional to the lightness of the air and to the number of boats rounding close astern and inversely proportional to the advantage of the jibe side. An improvement in technique will extend the range of usefulness of the manoeuvre. If it is possible to preserve speed while hoisting and jibing, a lesser advantage to the jibe side of the course can be exploited and the manoeuvre will be justified in lighter air and more crowded conditions. Rounding to a run is a critical portion of every race; in very light air the variation in speed and distance sailed by two different boats can be dramatic. Perfecting the art of the light air jibe set can pay handsome dividends.

The essential elements of a jibe set which preserves (rather than dissipates) speed are a smooth, gradual turn and the filling of the spinnaker on the windward side before the jibe occurs. If the spinnaker can be filled before the boat has fully borne away, it will act to preserve the speed residual from the windward leg. And if it can be filled prior to the actual jibe, it will be possible to keep it filled during the jibe. If it doesn't fill before the jibe, it will not be filled during the jibe and, in the almost dead air as the boat heads downwind, it will not fill for a long period after the jibe.

Getting the spinnaker to fill initially depends upon exposing it as it is hoisted, free of interference from either the jib or the main. The jib should be dropped to get it out of the way and this must be the first order of business as the mark is rounded. The jib halyard should be uncleated and uncoiled before the mark is reached so that as soon as the boat is around the mark, it can be released and the jib will drop. The mainsail cannot be dropped; it must be kept out of the way by hoisting the spinnaker on its windward side.

The remaining choices then are, as the sail comes up to windward, not to set the pole until the spinnaker is hoisted to set the pole to windward, or to set the pole to leeward. If the spinnaker is hoisted without a pole, it is difficult to extricate it from the falling jib and difficult to spread and expose it in the dying wind. If the pole is set to windward then it has to be switched to the opposite site as the boat is jibed. This may be difficult to do without delaying the turn and leaves the spinnaker unsupported during the critical period of the jibe itself. In fact, setting the pole to windward unnecessarily delays the turn (until the sail emerges from beneath the jib, fills, and finally stabilises). If an immediate jibe is indicated the best solution in most small boats is to set the pole to leeward so that the guy can be trimmed through it, spreading the spinnaker, as it goes up. This, of course, means that the spinnaker should be rigged to arise from the windward side, fully exposed, as it is hoisted, its clew being lifted by hand, if necessary, to assure its early filling. If the hoist is commenced with the jib already falling, the sail should fill as it goes up, be completely filled as the boat reaches dead downwind, and remain full as the boom is brought gently across. The boat should be able to retain its speed and carry that speed right up to a high on the wind, clear air, going the right way course.

JIBING IN WINDS OVER 20 KNOTS

by SAM MERRICK

The one experience in a Soling that can be intimidating is jibing in over 20 knots of wind. At the windward mark the spinnaker goes up and away you go on a plane headed more or less for the distant leeward turn. You will soon realise things seem more stable (less out of control feeling, while rolling) by heading a few degrees "up" from directly downwind. But, the wind shifts 10 degrees, so in order to avoid more departure away from the course, you realise you have to jibe. The leaders seem to take it in stride, but a boat nearby enjoys what we have termed a "death roll". A death roll while jibing ends up in complete disarray, spinnaker flogging, crew hanging on, and the boat half full of water. What went wrong? The single answer (except for a freak gust or the tiller breaking) was that the skipper failed to steer the boat downwind - he got distracted by more than steering and allowed the boat to round up out of control. To avoid this on your boat, follow these simple steps:

JIBING IN WINDS OVER 20 KNOTS – continued

(1) The number one priority is to have the skipper do nothing but steer. He must steer away from the 5 degree "safety" course to directly downwind, to 5 degrees more to get the boom across, to directly downwind again for a brief period - in a flat S turn, then finally to the "safety" 5 degrees for the new tack.

(2) The boat's middle crew is in charge of the mainboom - NOT THE SPINNAKER - during the jibe. Before the jibe, he overtrims the spinnaker somewhat and cleats it. This person also trims the guy several feet as a response to the pole getting detached from the mast and cleats that too. He is now free of spinnaker duties and should be coached, cautioned, and given a mindset to do his job with the main boom completely, with the boom again tugging at the mainsheet on the new jibe. If he hurries to get back to the spinnaker, the boom might not be quite ready to assume its new position and go back just in time for the skipper to be heading into the jibe. Trouble will be on the way then.

(3) The pole man is on his own - doing his own thing. He will get help from the middleman when the boom is safe on its new side. The new guy will need enough easing to allow the pole to be attached to the mast - be aware that he eases it with restraint. An eased guy at the end of a jibe in heavy air is the next most frequent cause of a broach (after bad steering). Cleating the guy and the sheet will be more work for the pole man - but it is safe.

(4) Practice the above in 15 knots so when it blows over 20 you'll have the technique down.

HEAVY AIR RUNNING AND BROACHING

by STU WALKER

Problem

Maintain speed and utilize waves despite risk of sudden increases in yawing moment to windward or to leeward, occasioned by heeling and/or rocking, asymmetric immersion of the bow and/or pitching, abrupt change in course (yawing), displacement of the centre of effort of the sails, or oscillation of the spinnaker.

Solution

Keep boat and sails flat and stabilised. Avoid abrupt alterations in yawing moment when altering course (to respond to waves, when jibing, etc.). Keep sails trimmed at all times, to provide a modest windward yawing moment and to avoid inducing vertical or horizontal oscillation.

Responses (Theoretical)

Keep the boat upright, particularly when the bow enters the back of a wave or when the course is altered deliberately.

Alter course (for jibing for instance) only when the boat is surfing and the bow is not immersed in a wave. Distribute the crew so that the boat is level both fore and aft and athwartships.

HEAVY AIR RUNNING AND BROACHING – continued

Prevent rocking. Do not allow the upper portion of the mainsail to become so full or be so oriented that it generates lift perpendicular to the long axis of the hull. Do not allow the spinnaker to become so full that it generates lift perpendicular to the long axis of the hull and oscillates.

Keep the main and the spinnaker trimmed flat so as to maintain a modest windward yawing moment (and to prevent rocking).

Responses (Practical)

Keep the mast raked aft. Ease backstay, Cunningham, vang, etc., sufficiently to prevent compressive bending.

Keep the outhaul tensioned so as to decrease mainsail draft.

Trim vang/mainsheet so that mainsail is flat with little twist, leech is flat, and boom is approximately 45° off centre line. A special knot should prevent the boom from going out too far (permitting it to be released By the Run as the weather mark is rounded). The major cause of broaching while running is allowing the mainsail to be too far outboard thereby generating athwartship lift.

Keep boat upright and bow level (or up). Keep crew weight equally distributed athwartships and ready to move fore and aft in order to keep bow approximately level - bow down when riding up the back of a wave, bow up when surfing down the front.

Set pole sufficiently for aft that spinnaker is flattened across the jibstay and cannot oscillate. Set pole lower than usual to further reduce oscillations if they occur.

Lead the spinnaker sheet and guy to the deck (or gunwhale) amidships (through the use of twings, hooks, or snatch blocks) to diminish oscillations.

Trim spinnaker sheet so that luff barely lifts and trim hard whenever it does.

Surfing
Decrease resistance

Keep the boat approximately upright and approximately level throughout.

Use slight variation in hull trim rather than rudder action to steer.

Keep boat on wave face

Head up to accelerate through wave back.

Bear away as soon as boat's chest emerges onto wave face and ride directly down wave face. If waves are short (and therefore slower than boat) ride across face to avoid running into back of wave head sooner than necessary. If waves are long (and therefore fast) maintain whatever course on the wave face that through the combination of aero dynamic force and slope drag provides the greatest speed and the longest tenure on the wave face.

continued on page 38

HEAVY AIR RUNNING AND BROACHING – continued

Facilitate surfing by diminishing resistance abruptly

Hike hard to jolt boat upright as boat starts down wave.

Jerk rudder to weather to break hull free of attached flow.

Pump sails

Pump (no more than three pumps per wave are allowed) spinnaker. (The spinnaker is by far the more powerful sail and therefore the one which if present should be pumped.) Pump guy back and trim sheet simultaneously as boat is hiked hard and borne away down the wave.

Pump mainsail if the helmsman can do so readily without comprising his steering, or if a crew member can co-ordinate the pump precisely with the steering and with the pumping of the spinnaker. In spinnaker-rigged boats, steering and spinnaker pumping are so much more important that less than optimal mainsail pumping often does more harm than good.

Avoid broaching

In very heavy air beware abrupt course changes, pumps associates with excessive easing of the shifts (before or after), abrupt shifts in crew weight (particularly to windward), courses angled across the wave face which may be associated with heeling and asymmetric immersion of the bow, and running into the back of the wave ahead while heeled.

Prevention of broaching while jibing

Broaching is due to yawing imbalance - either an excess moment turning the boat to windward or to leeward. Prevention depends upon keeping the boat in balance - preventing alterations in hull immersion, rig attitude, or sail shape - during the jibe. In really heavy air, it is sensible to wait until the "right" moment - a cockpit-filling broach will lose far more than an extra 50 yards on the initial jibe.

(1) Tension the twings so that near the shrouds the sheets are at boom height.

(2) Square the spinnaker - preferably to previously tested marks on the sheets so that the tack and clew are equally far aft (the tack pulled back 18-24 inches from its usual running position) and the foot of the spinnaker almost touching the jibstay. Cleat both sheet and guy.

(3) Send the foredeck man up on deck as the bow breaks through a wave crest. Have him wait for an order before jibing the pole.

(4) When the boat begins to surf down the wave front, have the deck man jibe the pole and simultaneously, the middle man throws the boom across.

(5) As soon as the boom has crossed the centre line, counteract the turn (bear away on the new jibe) and

HEAVY AIR RUNNING AND BROACHING – continued

have the middle man grab the sheet and sheet in hard.

(6) Re-attach the pole to the new guy (if not already accomplished) and to the mast. Ease the guy forward as the pole is pushed out.

Do not hesitate - once you start, keep going. Have the middle man brace himself for a real effort in getting the boom across and throw it. Bear away as far as necessary to bring the boom across and then counteract the turn.

In a real gale remember it is far easier to recover from a broach to windward than to leeward. Set the boom up so that there will be a residual windward yawing moment - trim the mainsheet before the jibe (the mainsheet knot should be further from the end so that it is impossible for the sheet to run out too far). The old guy should be brought back "too" far when in doubt and the new sheet "over" sheeted at the completion of the jibe to insure that the spinnaker does not oscillate and that it contributes to the residual weather yawing moment.

Recovering from a broach

Recognise whether the boat can be brought back on course easily, with difficulty, or (almost) not at all. Broaches to windward are usually controllable: broaches to leeward ("Death Rolls") rarely.

Easily (to windward)
Bear away - if no response:
Release spinnaker sheet
Wave bearing away excessively and broaching to leeward
Sheet spinnaker back in before boat has borne away completely (to prevent broach to leeward).

With difficulty (to windward)
Release spinnaker sheet - no response:
Boat rounds up beyond wind abeam
Release vang and mainsheet
Continue to head up with spinnaker ragging, until boat comes upright.
Bear away, trim vang, and then after boat is back on course, upright, and moving, trim spinnaker sheet (but before boat has borne away completely).

Not at all (to windward)
Boat refuses to bear away, remains blown over, cockpit fills, despite releasing vang, mainsheet, and spinnaker sheet —no response.
Never release the guy
Trim spinnaker sheet
Release spinnaker halyard and continue to trim spinnaker sheet.
Gather in spinnaker to leeward as boat rounds up further and comes upright.
Bail - or bear away and bail automatically.

Not at all (to leeward)
Boat wipes away to leeward, mast comes over to windward as boom points skyward, spinnaker pole goes under water, water pours into cockpit from windward side.
Recovery will be abrupt and disastrous:
Do not release sheet, (or guy, of course). Usually sheet is trimmed (though not sufficiently) as broach occurs. Sheet in harder, if possible.
Release halyard. If boat is still heeled to windward, spinnaker should fall into water to windward and/or be recovered easily as the boat abruptly comes upright.

If boat comes upright before spinnaker halyard can be released, sheet in hard (if not already done) and release halyard. Drag spinnaker down through rigging.

Never release halyard until sheet (and guy) are trimmed in. Otherwise spinnaker may fill far to leeward and hold boat over.

Bail – or bear away and bail automatically.

PRACTICAL RECOMMENDATIONS

MASTS BREAKING

Many masts broke in the strong winds and short chop at Balaton - but many more survived. They break when they are suddenly exposed to a shock - as the bow slams down into a wave, as the spinnaker fills, as the backstay is released and they break where a hole has been cut in the leading edge (a particularly likely place is the site of exit of the spinnaker pole topping lift). They are most likely to break when the bottom portion of the mast is fixed - held stiffly - and the top is mobile - free to move in response to the shock. More masts broke at Balaton than would have broken in the same conditions ten years ago - because of shroud tracks.

Moving the shroud cars aft (behind the "null point") pulls the spreader tips (and the mast itself at the level of the spreaders) aft. This stiffens the lower mast and prevents the transmission of bend and shock waves below the hounds. The unsupported upper mast, whipping about above the fixed hounds breaks off readily when shocked.

Mainsheet and backstay tension provide the only support for the upper mast, consequently, the mast is unlikely to break while sailing to windward even when the boat slams into a wave. It is before the start and on reaches and runs when the mainsheet and often the backstay are released that the mast is most likely to break, moderate backstay tension is supportive but, because it pulls the mast out of column, excessive backstay tension and mast bend may also facilitate breaking.

Recommendations for Heavy Air:
Before starting:
Particularly if upper shroud tension is high (800 pounds or more), avoid pulling the shroud cars aft until on the start approach or at least only in the presence of moderate backstay tension.

At the Weather Mark
As you bear away around the weather mark, easing the mainsheet, ease (do not abruptly release) the backstay to a state of moderate mast bend. Next, if running or broad reaching, release the shrouds cars to the null position. Then, and only then, set the spinnaker If desired, after the spinnaker is set release the backstay gradually and pull the mast forward with the jibstay. Retain some backstay tension (against the jibstay) to support the upper mast and prevent reversing the mast bend (do not allow the mast tip to bend forward as the spinnaker pole drives the lower mast aft). It is equally safe for the mast (and permits better flattening and control of the spinnaker) to keep the mast aft with minimal backstay tension.

MEASURING JIB SHAPE

by IAN MACDIARMID

Firstly you must stretch up your jibs using an old spinnaker halyard as a forestay and measure the depth of cord, angle of attack and angle of exit using a constant forestay sag of 65 mm. The jib is hanked onto the wire and held up by a rope as a jib sheet at the clew.

With the jib leech pulled straight and the foot set with a 160 mm sag in the foot of the heavy 5.6 and 220 mm sag in the foot of the light (as the foot is set on the boat with the foot set 50 mm outside the rib on the deck), you can now measure the cord depths across the sail. By using a light 3 metre long straight edge and a tape measure, calculate the cord depth percentage at three position at 90° to the leech. The second step is to measure the angle of attack of the luff by using a square with an adjustable lever arm. Do the same for the leech.

The leech is very important as it will tell you how old the jib is getting. Its straightness changes rapidly after only four races making the boat much harder to steer in moderate to heavy winds.

This record of jib shape is vital information because you FINALLY have a record of what you know is a fast or a slow sail!

Once the angle of exit has changed 8° from straight the jib has finished its racing life. Many jibs that I have seen (and measured) would never be fast even from new. Fast Soling jibs, even dating back to the Worlds in New York have always been the same shape across the cord, the only difference being the amount of hollow cut in the luff to allow for forestay sag. Jibs with rounded leech shape (more than 8°) perform well only on small lakes where very flat water is encountered and only between a wind range of 6 to 11 knots. The moment the boat has to be steered around more than the very small amount that is required in the flattest of water, it will be slow. I can explain this by saying the leech ribbons stall out much too easily.

Double jib snaps are used more for changing the angle of attack of the luff than changing the fullness. When you have chosen the wrong main or jib for the conditions, you can change the depth and angle of attack to a respectable combination and possibly save yourself from a disastrous result. (In Travemunde Woche one year we changed our main sail on the second reach in race 3 from a flat to the full because the wind began to increase past its range. We went on to win! This is only emphasising the need to be flexible in your thinking and be organised enough in the systems on your boat to do what is required when needed. It is no fun returning to the bar and telling the crowd how you may have won if you had had the other main or jib on.)

Everybody is worried about forestay sag, only because someone told them it was a bad thing to have. Forestay sag can be used to advantage! If the stay sags in the middle and we ease the jib so its leech sags a corresponding amount, then there is really no difference. However, you can use a very much fuller main sail and have no back winding - so more power. This can be used to enormous advantage in light to moderate winds with rough water. We learned a lot from this in a very short time. When someone is faster than you in a race and you don't know why, then you can start by stepping onto his boat and comparing shroud tensions. If there is a difference try his tensions next time you sail in

MEASURING JIB SHAPE – continued

similar conditions.

When you find excellent speed in any wind range, write the shroud tensions on the bulkhead so you do not lose them! It will still be fast in 10 year's time, the same way a fast sail will be fast in ten years if you know exactly what shape and depth it was.

We adjust our shrouds each time the wind changes more than 4 knots or the water significantly changes. We use Elvstrom shroud adjusters at the deck so the shrouds can be adjusted any time it is necessary. In this way shroud tension can be changed when in close company and evaluated on the spot. The Abbott system of having the adjusters on the cockpit floor is ridiculous.

P.S. Our light jib draft is 15.5%, heavy 12.25% set on a 65 mm sag.

TECHNIQUES AND FITTINGS

Ball bearings in travellers

Sooner or later the deck strap that rides the car on the main traveller will show the strains of wear. Suddenly you will have no main sheet. A quick temporary fix involves drilling a small hole through the track and using a bolt to fasten the block at the centre line. But be careful about drilling holes in the track and not filling them later. Such holes permit the ball bearings to escape one by one.

While we're at it, ball bearings need special care - they have a way of running off somewhere during the removal or re-installation of the traveller cars. Such hazards can be avoided by using the black plastic tape which we use for everything else. For removing the car, gently stick 6 inch lengths of tape on both sides of the vertical surfaces of the track. Work the car to the track covered by the tape. Then bring the ends of the tape outside the car and firmly stick them together overlapped. With a little working, you will be able to slide the car, wrapped now in tape, down the track and off without a single ball escaping, since they will be held into position by the tape. On the return voyage, the tape should be applied sticky side toward the bearings. You will find it easier to do so in order to cover one side of the car (laid sideways) at a time and wrap the tape around the car before inserting the bearings and rings on the other side. This allows returning the car to the track with the non-sticking side toward the track. It is easy to get the tape off when the car is safely captured on the track.

Another simple solution is to slide the car off onto a short segment of extra track and tape it to the track.

Rudder and tiller play

Over time, the various links between the tiller and the rudder will wear or weaken and produce play which is most undesirable. Abbott's advice is to keep the bolt well tightened

TECHNIQUES AND FITTINGS – continued

- constant attention is needed to do so, because it will loosen in use. If that happens, watch out.

Despite keeping the bolt supertight, play in the system will occur. If the bushings at the top or bottom of the rudder post are the cause, major surgery is necessary. But there are two other causes which can more easily be eliminated. The holes in the casting can be shimmed if they become elongated (by not keeping the bolt tight). The other cause is elongation of the hole which contains the pin in the actual rudder post. If the pin gets loose and drops out, the rudder will be lost. You can approach this problem by drilling a slightly larger hole and using a new pin - this is machine shop work because of exacting tolerances required.

Mast collar
To keep the bottom of the mast from spreading or splitting, it should be surrounded by a stainless steel band. Some mast steps do not permit this band (collar) to be fastened to the mast by rivets or bolts (as they would protrude internally in the way of the step). To keep the collar in position, a wide, multi-layered band of tape may be applied above it.

Fibreglass tape may be used for the same purpose or with a few carbon fibres included may substitute for the stainless steel collar itself.

Tiller extension
The tiller extension tends to drop beneath the level of the tiller and as a consequence the end of the extension may drop beneath the cockpit coaming. This may have disastrous results if when attempting to turn the boat to windward, the extension jams beneath the leeward cockpit coaming. A 3-4 inch diameter, one-eighth inch aluminium disc (round or rectangular) may be fastened like a washer between the tiller and the extension. This will keep the extension from dropping below the horizontal and prevent the cited disaster.

Changing the jib sheet attachment
(In response to suggestions from Al Starratt, Buddy Melges and others.)
Attach a short length of light line so that it dangles from the forward edge of the clew board and secure it to a cam cleat mounted on the aft edge of the traveller (one each side) when changing is required. Alternatively lead a line ending in a hook up from the deck aft of the traveller (one each side) to be attached as required. Such auxiliary lines can also be useful if the jib sheet fails.

Checking wind direction
Use the jib (when it settles in the mid-line) as the indicator. Draw a long, carefully measured lubber-line on the deck forward of the compass to make sighting easier.

Rehoisting an unpacked spinnaker
To minimize twisting as the halyard goes up, leave the sheet free but pull the guy around rapidly.

Jib traveller settings
Maximum in (61/2°?) at 4-12 knots in smooth water. Farther out in very light air, heavy air and in waves. The luff of the main should always lift slightly from the air flow off the jib leech. Rarely need to go more than 4 inches farther out than maximum in.

Spinnaker stowage
The spinnaker storage lines should be rigged so that the spinnaker (1) can be readily pushed into it as the spinnaker is lowered and (2) held within it, so that it cannot escape thereafter. This means that the wall of the bin facing the cockpit should be moveable, its upper edge held up under the deck when closed and capable of being pulled out and down when open. The best way to achieve this is to use a piece of aluminium tubing along the upper edge of the bin and to run a long piece of shock cord through that tube. The shock cord should extend several feet either side of the bin and run through small blocks. A hook can be attached to the middle of the tube to facilitate opening the bin and when hooked to a pad eye on the cockpit floor to keep it open (while the spinnaker is being stowed).

RUDDER PIN WARNING

by LARRY BOOTH

The only thing that holds your rudder to the boat is a 1/4 " diameter by 1 3/4" long stainless steel pin that goes through the tiller head sleeve and rudder shaft above the deck. This pin can be removed by simply knocking it out with a hammer and punch.

As long as the tiller is in a horizontal position, the pin is prevented from movement by two flanges connected to the base of the tiller. But when the tiller is in a raised position beyond about 30° to the horizontal, nothing is preventing the pin from moving out of the hole except friction between the pin and the rudder shaft.

Under normal conditions this is not a problem because the friction is adequate to hold it in place. However, trailering the boat with the tiller in a slightly raised position is another matter.

Upon leaving the Canadian Olympic Regatta at Kingston one year, we inadvertently tied the boat down with the tiller going over the wooden bolster for the mast instead of under it, as we normally do. Eight-hundred miles later when we arrived back in Milwaukee we were shocked to find that the road vibrations had worked the pin out and it was completely gone - so was the rudder and its shaft! They had fallen off somewhere along the way and we never heard a thing.

If you leave the rudder on when trailing your boat, always be certain it's tied down in a horizontal position. Many people take the rudder off completely for travelling to avoid the additional possibility of another car running into the rudder from behind. I think this is the preferable method.

One word of caution if you remove the rudder. The edges of the rudder are very brittle and it does not take much to chip off a corner. Be very careful not to bump it against anything and don't set it down on a hard surface. It is heavy and awkward to handle, so take extra care.

MARKING UP YOUR SOLING

by JOE HOEKSEMA

With our first Soling we thought that having a lot of reference marks and tuning guides would be helpful. So we put these stick-on rules and number guides everywhere and marked up each line with multiple and various colours. We soon discovered, however, that we almost never used these guides and that most marks we had made were useless, or at best, confusing. When we bought our new boat in '82 we decided not to use any marks or guides, but realised quickly that this wasn't fast either. Finally, at the clinic prior to the U.S. Championships in New Orleans that year we got on track when Dave Perry, Peter Isler and Dave Curtis discussed what reference marks they put on their boats and how they used them. Since then we've paid a lot of attention to how the experts "mark up" their boats. I'd like to share some of their better ideas with you.

Marks that are a must

● *Spinnaker sheets* - The single most important mark you use on a Soling is the one on the spinnaker sheet. It should be highly visible and placed at the point where the guy is cleated on a close reach (note: just off the headstay) in moderate air. Dave Perry says to use whipping line here for two reasons: First, with Kevlar sheets the cover slips over the non-stretch core and what you mark is the point on the core. Second, the person(s) who handles the sheets through the gybe wants to be able to feel the mark and not have to take their eyes off the spinnaker to look down to find where the new guy is to be cleated. Remember, one mark is all that is needed here. Extra marks for guy trim on the run are never accurate and depend on whether or not twings are used. You'll soon get used to looking at one mark and how far it is from the cleat for various conditions.

● *Backstay* — The backstay is marked so that it can be quickly trimmed at the leeward mark to the upwind setting. The mark should be on the backstay just above where the stay exits the deck. The three most frequently used methods are:

(1) a clear plastic tube over the backstay
(2) multiple marks either painted on the backstay or with yarn threaded through the wire; or,
(3) a small batten with multiple marks on it that is affixed to the transom.

● *Forestay* - The fine tune for the forestay should be marked where it is cleated for a known amount of rake. This should be an average setting and adjustments can be made in or out from this benchmark for different mainsails and conditions. Having different marks for full or flat and different settings results in a line so marked up that it is confusing. As a rule we find that the fewer the marks on any one line the better. One mark is the simplest and usually sufficient.

● *Marks on double ended leads* - For the purposes of trim adjustments marks on these lines are obviously useless. But a single mark on each of these leads for the purpose of pre-race set up and proper distribution of lines port and starboard can be very helpful, especially on two or three race days. What happens on the race course (with marks to port) is that several controls are eased at the weather mark on starboard and taken up at the leeward mark on port. After three or four mark roundings all the lines end up on port, while on starboard the lead is all paid out and can't be eased. The proper pre-race set up therefore is to have most of the line for these controls to starboard with just enough on port to adjust sail shape. On our boat we have a mark on each side of the double ended leads for the backstay, jib car, vang, Cunningham, outhaul and jib halyard and tack thus ensuring proper distribution of line before the start of the race.

● *Sail shape adjustments* - If you look at the experts' boats you never find stick-on rules or measurement marks on the mast next to the Cunningham, or on the jib or main travellers, or on the boom for the outhaul. The reason is that when you adjust the Cunningham you look at the draft and luff wrinkle, not at where the Cunningham is in relation to a fixed measurement point. In addition, these adjustments already have a clear visible reference. For example, the position of a jib car can be checked at a glance by where it sits in relation to the cockpit combing and outboard to the splash rail. (Melges-". . . trim the jib to the hump.") The main traveller is adjusted to keep the boom in the centre line and the outhaul is trimmed relative to its position to the black band and sail shape, nor to a given number on a tape.

Miscellaneous marks

● *Spinnaker pole height* - We don't mark the pole up or down haul other than to put a figure eight knot in the pole downhaul at maximum pole height. This serves as a quick and visible reference (8 inches from the knot in light air with a low pole and 2 inches from the knot in heavy air close reaching, etc.). In addition the knot prevents the pole from "skying" if the downhaul is accidentally released.

● *Spinnaker halyard* - The only mark necessary here is a mark to let the crew know when they have reached max hoist. This mark should be big and placed about 10 inches from the maximum hoist position. This enables the crew to see when the chute is almost all the way up.

● *Twings* - Twings should be marked at the positions where they just keep the spinnaker sheet beneath the main boom. This mark should be placed on the twing right where it exists from the deck and is easily visible. It should not be placed under the deck where the twing is cleated.

The right reference marks, properly placed, can give you an added edge while racing. Keeping the number of marks to a minimum and the system of marking simple will make it more likely that the marks will be useful.

THE PRINCIPLES OF CREWING

1. Communication

A. WHAT THE CREW NEEDS FROM ME.
1. KNOWLEDGE
I'll give you as much training and understanding as possible. If you don't know what you should do, ASK - in advance.
2. ORDERS
Be alert to them, pay attention - particularly at critical times (starts, mark roundings, crossing other boats, etc.) Listen for my orders. Obey them as quickly as possible - But remember that it is more important to do it right than to do it fast! There is probably another job waiting to be done (which I am waiting to order) as soon as you finish this one.
3. MOTIVATION and SATISFACTION
Sailing well is extremely satisfying. If we sail really well, we will win and that is even more satisfying,
You contribute to that outcome by doing your job without distracting me and by obeying my orders as efficiently as possible.
4. APPRECIATION
When you do your job well, I will tell you so. If there is anything you like or don't like or any philosophical point you would like to make, tell me about it - after the race.
B. WHAT I NEED FROM THE CREW.
1. NO DISTRACTION
The greatest possible crew is the one of whom the helmsman is unaware.
2. SUPPORT
Let me know by word and deed that you too think winning the race is worthwhile and that you believe we can win it. Remind me that the race is always from here onward and that regardless of how far back we are (what mistakes we have made) we still have a chance. Recognize that I may not always be right, but that I'm doing my best. Backing me is the only way to victory.
3. INFORMATION
Tell me what I cannot see or learn for myself (not what is obvious to all)! Time (before the start) compass headings, boat speed, leeway, and pointing relative to boats I cannot see headings of boats and wind velocity on the opposite side of the course. The approach of boats (particularly right of way boats) on opposite tacks (or jibes or from astern or to leeward before the start).
Tell me in a factual, unemotional, non-threatening tone. Always tell me how we are doing - slower than the boat on our weather quarter, about to cross clear ahead, etc. - to avoid confusion and because it is only our performance that I can control.
4. REMINDERS
Remind me what I told you to remind me, what I told you I planned to do whether to consider a change in sail trim (or sails) with a change in wind velocity, what the course to the next mark is, what the compass headings on the last beat were. Help me to avoid the big mistakes. Not recognising an advantage to one side of the course (Category 11) Getting too close to the laylines too soon. Not knowing where and at what sailing angle the next mark is.

2. Boat Speed - Weight Distribution

The position of your weight has many important effects upon the boat's performance. (One of the major reasons (perhaps the only!) that you are on board is because your weight is needed).
A. STABILITY
Maintaining all portions of the sail plan at a constant angle of incidence to the wind is extremely important.
1. Move your weight carefully so as not to disturb the angle of heel or the fore and aft trim.
2. Move whenever necessary to keep the angle of heel constant let whatever angle I choose for the conditions) and the fore and aft trim constant.
3. Let me move first - I know the trim I want and I need to attain a position from which I can see and feel readily.
B. IMBALANCE AND FRICTIONAL RESISTANCE
1. Shift your weight so as to heel the boat to windward when running and to leeward when beating in light air: otherwise keep it level.
2. Shift your weight forward when running and aft when reaching in heavy air.
C. ACCELERATION or the prevention of deceleration while turning.
1. LUFFING
Shift weight to leeward so that the boat will heel and develop a windward yawing moment (reducing the need for excessive rudder angulation)
2. BEARING AWAY
Shift weight (or retain it) to windward so that the boat will come up right (or heel to windward) and develop a leeward yawning moment.
3. TACKING
"Roll tacking" (and "roll jibing") utilizes crew weight to facilitate the turn and to alter the direction and force of the apparent wind. Shift weight to windward until the boat is head to wind and the boat heeled to windward and then shift weight quickly to the new windward side.
4. JIBING
"Roll Jibing". Shift crew weight to heel the boat to windward and then shift weight quickly as the boom comes across to the new windward side so as to stop the turn.
D. FACILITATION of SURFING or PLANING
Rapid movement of crew weight to windward and forward and then aft is useful in initiating surfing or planing. Try to keep the boat upright and level fore and aft unless I tell you differently

3. The Jib

A. THE JIB IS THE MOST IMPORTANT SAIL ON THE BOAT. IT IS YOUR RESPONSIBILITY.
The jib sheet is the most important control of jib shape. Adjust it whenever:
1. The heading angle of the boat changes.
2. The wind velocity changes. **3.** The boat speed changes.
B. If I say "Ease it" or "Pull it", I mean a quarter of an inch (not a foot!) unless I tell you differently.
C. KEEP THE LEEWARD JIB TELL TALES FLOWING AT ALL TIMES:
1. Before the start - I want maximum speed unless I tell you differently.
2. In light and fluky air, the jib can be eased more rapidly (and more efficiently) then the boat can be turned.
3. When rounding the leeward mark the apparent wind moves aft and to avoid stalling it, the jib must be trimmed very gradually.
4. Trim the jib according to the boat speed, fuller, more open, more twisted when the boat is going slowly (after starting tacking, hitting a wave, being in dirty air, etc.) and flatter, more closed, less twisted when the boat is going fast (after getting up to speed, in smooth water, in clear air).
D. BUT REMEMBER THAT THE JIB HAS OTHER CONTROLS AS WELL.
1. The jib lead position (if adjustable) may have to be adjusted laterally and fore and aft, particularly for changes in heading angle. When reaching it is usually impossible to displace the lead sufficiently far laterally, (so it should be displaced as far laterally as possible and the jib sheet eased.)
2. The Luff tension should be altered for major changes in wind velocity/or boat speed. Ease the Luff tension when the wind velocity decreases and/or the boat speed increases (smooth water). Increase the Luff tension when the wind velocity increases and/or the boat speed decreases (waves).
E. BE PREPARED FOR ME TO GIVE YOU ADDITIONAL SPECIFIC ORDERS MODIFYING OR COUNTERMANDING WHAT YOU ARE DOING.

4. Boat Handling

Rehearse in your mind what your duties will be before each manoeuvre; starting, rounding marks, tacking, jibing, luffing, bearing away, etc., Do what you have practiced. Don't be distracted (by noise, other boats, other members of the crew, non essentials).

GETTING NUMBERS OFF SAILS

by VOICE OF EXPERIENCE

The problem
If you get a different boat, the numbers on the sails you keep will have to be changed. Modern adhesives used by the sailmakers don't make the job easy. Many sailmakers who have not had much call will look at you with little enthusiasm - because they have tried to remove them the way I did.

The way not to
Start by pulling the number off. Little by little, most of the number material will come off. Then get acetone after the adhesive - it will get sticky and so will your hands. Then get paint thinner, a cloth and rub. Get some steel wool and finally the adhesive shows signs of giving up. After several applications and lots of elbow grease, one number will have been removed—29 to go! You start on the second, but after a while you notice the first one's area is dry but still sticky. Another application and a new cloth and the job for one is finally completed.

The right way
Start by turning the sail over and spill a little thinner. Work the thinner so that the back of the number is visibly wet. Let it sit for a few minutes. Turn the sail over and peel. The number and almost all of the adhesive comes off in a nice sticky mess. With a clean cloth saturated in thinner rub off the residue adhesive and then dry it off with a cloth. Easy.

FLEET PROMOTION

BUILDING LOCAL FLEETS

Notes from the US YRU Seminar, October 1988.

- **Have a boat available for new people**
  -Fleet members pitch in to buy boat and rig it each race day.
- **Have race leaders share expertise**
  -Winners roast
  -Gather 'round the keg and chat
- **Special attention to new folks**
  -Buddy system
  -Fleet callers to help with everything from tuning the rig to finding babysitters
- **Family Events**
- **Lessons for Beginners**
- **Visible Activities**
  -Signs, T-Shirts
  -Let people know who you are and how to join in
- **Help Off the Water**
  -Rigging, Parts
  -Launching
  -Answer Questions
- **Plan, Research and Market**
- **Set Goals, Measure Progress and Report Results**
- **Change Places**
  -Novice Night – Make boats and skippers available as crew
  -Have regular racers be race committee
  -Crew Race – Crew steers, owners gybe the pole
- **Hire or Otherwise Get Someone to Organize Things**
  -Avoid having "experts" or the same volunteer do all the work - they want to race also
  -Have a group fleet commodore assign events for individual responsibility
  -Find people other than the sailors: fathers, wives, sea explorers, etc.
- **Run a Regatta Without Keeping Scores**
  -Don't even write down the finishes
  -Lots of short races
  -Encourage boat/skipper/crew/race committee swaps
- **Invite Guest Experts**
  -Raffle off races with the experts
  -Let everyone sail with the experts
  -Make it fun for the expert too
- **Team Racing**
- **Get Young Folks in Racing**
- **Recognize Performance**
  -Most improved, helpful, shipshape, etc.
  -Big trophies for regattas when the hot shots are out of town at regattas
- **Use a Handicapping System**
  -Special regatta or at same time as regular racing
  -Pair top boat with bottom, second with second to last, etc.
  -Special awards for top guy in the "B" fleet, defined by no first places or ten worst finishers in the previous series: don't forget to have a way to climb out of "B"
- **Short Courses and Lots of Them**
  -Keeps the fleet close together
  -Great practice for marks and starts
- **Don't submit beginners to serious races with unfair expectations for their performance**
- **Hold tuning sessions with the boat on the trailer or at the dock**
  -Put up the sails and demonstrate adjustments
  -Walk through boat handling manoeuvres
- **Maintain and have available a list of used boats with all pertinent info**
- **Have regattas at home when the rock stars are out of town**
  -Lots of visibility -Trophies just as big
- **Special Races**
  -Round the lake
  -Progressive dinner – dock to dock
  -Crew race – owners gybe the pole
- **Run lots of races**
  -Allow throw outs so that people don't have to be there every race day
  -Shorter races
- **Shoot video, photos**
  -Show at the bar after the race
  -Use photos for local and national publications
- **Vary the social events; casual, formal, family**
- **Give up a few races yourself to sail with someone else**
- **Make It Fun**
- **Get People Off the Dock**
- **Keep Spouses and Children Happy**
- **Kill the Perception of High Cost**

BUILDING STRONGER, MORE ACTIVE, FLEETS

by LARRY BOOTH

The Milwaukee Yacht Club Soling Fleet with 15 boats is not the largest fleet in the country, but it is certainly the most active. During 1979 they averaged 11 boats per race - the third year in a row attendance has topped 70%. A remarkable average considering the fleet's fairly heavy club racing schedule of 59 races over a six-month sailing

How do they do it? Larry Booth MYC Fleet captain attributes their success to five things.

(1) Crew recruitment activities;
(2) A two-division scoring system,
(3) Special crew awards;
(4) Special pre-race sailing seminars; and
(5) An informal fleet newsletter.

(1) Crew turnover is a problem in any racing class and the only way to solve it is through a programme of active crew recruitment. At Milwaukee, getting crew for individual skippers is a fleet activity. Members are alerted to be on the look out for potential crew. If a member does meet or hear of someone, the name is passed on to the fleet captain who then calls the person and gives him a pep talk on Soling sailing. If they show interest, the fleet captain tries to arrange a crew position. If none are available, the crew's name and vital statistics (height, weight, etc.) are put on a crew list which is given out to fleet members for future reference.

(2) The two-division scoring system probably needs no explanation. It is a must in a moderate size fleet if you want to sustain the enthusiasm and participation of those in the second half of the fleet. And it's good for front-runners, too, because everyone sails harder, which makes for better competition all round.

(3) When it comes to passing out awards at years and the crew at MYC are held in the same esteem as the skipper. The crew members of each winning "team" get the same award as the skipper - a handsome 2" diameter Olympic-style medal hung on a red, white and blue neck ribbon. The medals, which the fleet had cast especially for them, are made in heavy metal alloys simulating gold, silver and bronze. The total cost of the three medals, by the way, is less than one of the typical store-bought skipper trophies, but their worth in motivating and retaining crew and fostering team spirit is far in excess of their price.

(4) To build members ability, the MYC Fleet conducts what has come to be known as Saturday Morning Seminars. A couple of hours prior to the fleet's Saturday afternoon races, fleet members gather on the dock beside a tied up Soling. Jack VanDyke and Charlie Kamps take turns leading discussions on any number of subjects, using the tied up Soling as their training aid.

(5) To keep the fleet informed on a timely basis and to present news and information they wouldn't otherwise get through the yacht club's newsletter or the *Leading Edge*, an informal fleet newsletter is sent out periodically. These occur mostly during the winter when the fleet is not in regular contact with each other. Probably it is no one particular programme which is most effective but rather the combined effect of all the efforts that has enabled and sustained member activity. It should be obvious, however, that no amount of ideas or innovative programmes will help an ailing fleet if there is no one to organise and follow through on them.

Building an active fleet is not so much a matter of having great ideas as it is having good people who are willing to give of their time and effort to see that those ideas are carried out.

SAFETY

SAFETY MEASURES

by DAVE PERRY

Here are a few thoughts that would make sailing and racing Solings safer.

Hiking harness

If the harness includes an *open-faced hook* to attach the hiking-aid line to, the entire harness should have a *quick-release capability*, so that the entire harness can be quickly and easily removed from the body. If one of the straps that comes from around the back was attached to the centre plate containing the hook, with a spring-loaded, quick release shackle such as the one used on the spinnaker halyards (the advantage of these type of shackles, is that once they are opened they stay open, and must be manually closed. Also, with a line attached, they can be easily opened under load.); then when released the entire harness could be quickly peeled off over the head.

Many crews have found that simply looping the hiking aid line over the open-faced hook is unsatisfactory, as it falls off too easily in tacks and other manoeuvrers. Consequently, many have modified their system to attach this line more permanently to the harness. If (a) the harness is easily and quickly removable, *and* (b) the hiking-aid line is easily and quickly detachable from the floor, I see little potential danger in this arrangement.

Further, in this case the *open-faced hook can be eliminated completely from the harness*, and a simple closed metal ring can be used in its place. The hiking-aid line would be attached to this ring, either with another spring-loaded quick-release shackle, or with a simple bowline, if (a) and (b) above are both the case. The shackle attaching the strap from around the back would also snap easily into this ring.*

*** Ed.'s Note: Since March 1987, a new class rule, 13.31— Hiking Gear - has been in effect.**

Hobbles (anklets for hiking)

The hobbles must be designed so (a) they stay on the ankles comfortably when moving about the boat and hiking; and (b) they are quickly and easily removable in a matter of seconds, including when under load. Again, the hobbles that Tucker designed were a big step in a good direction. The part of the hobble that came over the ankle was wide and well padded. The strap continued around under the ankle and back up inside the strap which was over the ankle. The underside of the wide padded part of the strap, and the part of the strap that came back around underneath it were attached to each other by wide, strong Velcro. With this system the hobbles are readily adjustable to the size of the sailor's boot and ankles, and with a quick separation of the Velcro straps, the entire hobble comes right off.

The reason I feel that the harness and hobbles should be designed so they can be removed from the body entirely and easily, is that even if you unattach yourself from the floor, you are still "wearing" a shackle that can attach itself to something else; your legs are still tied together with a line that can impede your swimming, and can catch on something on the boat; and if your harness has one, you are still wearing an open-faced hook on your chest.

On "Shen", my hiking system hooked into a fixed pad-eye ring in the centre of the boat (I was the middle crew). The shackle I used was a larger version of the same quick-release shackle used on the spinnaker halyard. I had a 5" piece of 4" line as a pull-string, and I made it a different colour than any other line we used in that area on the boat . . . so I could always find it in a mess.

Tucker attached to a bar with a Carbiner hook, which essentially is a spring-loaded snap shackle that opens and then snaps shut on its own. This type of hook runs very smoothly on the bar, and is fast to hook back up after a jibe or take-down. But, if you were swimming near a sinking boat with your hobbles, *et al.*, still on, this type of hook could attach itself to a shroud, etc. Also this type of hook is near impossible to release under load.

Buckets

We never discovered a good system to store our buckets so they were easily accessible if we needed them, but so they stayed out-of-the-way and didn't roll around the rest of the time. Perhaps someone in the class has; or at least if the group were together they should be able to figure out a good system. Maybe hanging them somehow up in front of the mast column, or under the stern deck lip, is a way to go. This might encourage more people at every level of racing the boat to carry three adequate buckets.

(Editor's Note: The three buckets can all be tied together with a single line through their handles and then attached under the foredeck by an easily-released bowline.)

Halyard tails

Storing the tails is always a problem. Perhaps a piece of shockcord around the mast column could be used to store the coiled halyard tails under. Most of us loosely coil up the tails and sort of toss them up forward.

The problem arises when there's 3" of water sloshing around up there, wrapping the tails around themselves and everything else. Also a knife in the "barney post", or somewhere easily stored and accessible can be useful in many situations. Also, what's the best way to store the spinnaker halyard tail, so that in a moment's notice, the chute can be dropped with confidence that the tail will run free. Jim Coggan's crew put their's in a bucket; we used to throw ours overboard.

(Editor's Note: The main and jib halyards should be coiled, tied off in a secure manner, and then secured under shockcord near the mast base. Release of downhauls, Cunninghams, etc., should reduce the tension in the halyards sufficiently so that they are easy to release. If the boat fills up, the best solution may be to drop the sails and bail.)

Bailers

One medium-sized bailer per side doesn't seem to be enough. Do two per side, with at least one being a *large* one (perhaps even a Super-Suck) do the trick? If so perhaps this should be strongly recommended or written into the class rules, and made mandatory for all Solings ever built. (I'm thinking of the older boats which may only have the one set in now.)

SAFETY MEASURES – continued

Control line catch-all bags
Soling owner's should be encouraged (required) to install a large bag attached beneath all their controls to catch the tails of the control lines as they are passed back through the deck for clean-up. We finally did this in "Shen" for the Trials, and it made a huge difference! The tails don't clog up the bailers, and don't get under foot on the cockpit floor. Perhaps a few Soling sailmakers could be encouraged to manufacture these.

(Editor's Note: A hammock of dacron [15' 6" x 20' (forward), 16" (aft) suspended under each side deck [from the bulkhead in the way of the mast aft to the site of the helmsman's control lines] will [1] catch all the control line tails, [2] prevent the lines crossing above the spinnaker lines from being trapped in the stowed spinnaker, and [3] provide an accessible place to stow the second jib)

Storing extra sails
Carrying extra sails is a standard hassle in the Soling. I suspect more than one Soling sailor has raced with their forward or stern bulkhead hatch cover off, and the sails stuffed up in there. What are some of the systems people have developed to carry their extra mains and jibs? It couldn't hurt to put a bit of emphasis on the consequences of a sudden broach with a hatch cover off.

Life jackets
Where do people store their life jackets when not in use? Not so good places are at the bottom of the starboard spinnaker bag, especially when filled with foul weather gear, sail bags, and extra spinnakers, etc.: and loose up front of the mast column, where they can float around or away in a sudden brooch. Better places might be on top of the mess in the starboard spinnaker bag, or in a specially installed bag under the stern deck lip.

I realise that putting the responsibility for hoisting a life-jacket flag in the hands of a race committee opens the door to some sensitive liability issues. But in fact, no sailors should need direction as to when to wear their jackets. If the jackets are comfortable and safe, they should be worn most of the time, as part of normal dressing for racing!

(Editor's Note: Life jackets should be accessible but not loose so that they can float away or become entangled in rigging. They can be stored under the stern or forward deck and held up by shock cords led through the deck stringers.)

"No spinnakers"
Do standard Soling sailing instructions have a provision for "No spinnakers"? In a boat with propensity for rolling and submarining like a Soling, a spinnaker is often the major cause for calamity. To avoid putting race committees in awkward and difficult positions, a fleet assembled should discuss openly during their skippers meeting or at some other forum, when such a flag might be flown. This would be affected by the sailing conditions, the number and quality of the boats assembled, the number and quality of the rescue boats on the course, and the importance of the regatta.

Knock-down technique
One boat in Argentina got knocked over on a close reach with their spinnaker up. Before they could take on too much water, the crew quickly released their spinnaker halyard. The boat immediately popped back up and just as quickly the crew hoisted the chute again. Through this, the guy was left cleated, and the sheet was let run free. It seemed like a good technique as long as the chute didn't get caught in the water . . . and worth passing on.

(Editor's Note: The important issue is *never release the guy* [until or unless the sheet is well in hand] so that the sail can flag, not fill, from one corner or the other.)

MAKE SAFETY A MUST – NOT AN OPTION

by SAM MERRICK

Let's agree safety just isn't an interesting subject, so that those of us who write about it are destined to be ignored much of the time. Nevertheless, here goes for an effort at the beginning of a new sailing season when all of us can do some things that will avoid anguish (or worse) before the 1992 season rolls around.

Boats take time - money too of course, but time seems more difficult to appropriate to the list of things that keeps on accumulating. Right off that's where safety comes in second to replacing frayed halyards, removing bent shackles, riveting loose fittings, getting correct sizes of cotter pins, retieing tired shock cord. *(On a Soling the soundness of keeping water out of the flotation areas should come first.)*

A few years back we had a race for which the forecasters predicted 8-12 knots. We put on our light air sails. By the end of the first beat it was 20; by the middle of the second reach we doused the spinnaker in 30 knot gusts. Before again getting to the windward mark, wind was blowing off the tops of the waves at better then 45. We got back to the lee shore harbour just as rain reduced visibility to zero. Boats still on the course had to survive the wildest of conditions or their crews stood a good chance of being lost at see. Such weather surprises are not uncommon. In 1978 at Kiel Week three Solings (water tight doors off!) sank when squalls filled them to deck level. The skippers were all World class types, so if it happened to them, it can certainly happen to the rest of us. Such incidents should be a warning to those who sail older boats to take special care when weather turns bad.

How about life jackets? Some are comfortable but not good enough to keep you afloat even in a bathing suit. Be sure the ones in your boat will perform when it's cold enough to sail with sweaters and boots. "Coast Guard Approved" on life jackets is not a gimmick to protect U.S. manufacturers. Jackets constructed of air cells are comfortable and effective when new. Because these cells fracture after long use, they lose their designed capabilities hence they are not CG approved.

Our class rules have been adopted to prevent the boats from sinking. Re-read Rules 12.11 through 12.222 and you will recognise how much attention has been given to assuring that compartments in bow and stern, and under the cockpit sole, will be as watertight as possible. The size and placement of holes for control lines are rigidly proscribed, and so are the means to be taken to insure watertight bulkhead covers. If those covers have been allowed to warp, or the gaskets deteriorate with age, renew the deficiencies as soon as possible. Their soundness is all that stands between floating and sinking after an unscheduled jibe in 25 knots.

Sam Merrick

Lifting slings is another area of concern. A Soling even without all its gear plus water, can weigh enough to kill someone if that person should be under the boat when the sling fails. Make a thorough inspection of the elements involved at regular intervals: the nuts on the keel bolts are probably solid enough, but the bracket holes may be too sharp for the wire unprotected by a thimble. The thimble on my current boat kept dropping out, so I replaced the whole apparatus, starting with two substantial stainless shackles for the brackets. In use, keep an eye on the wire to be certain that it is not being fractured over time.

Trailing boats on a highway has produced another set of legends - like the driver who noticed that the boat was no longer in his rear view mirror. (Of course, the car's occupants soon solved the problem of the boat's whereabouts as it came abreast, and rolled to a smooth stop.) Safety chains, the soundness of the entire hitch system, the ball bolt, the various welds or bolts tied onto the vehicle's frame. Every detail must run a test for possible failure. And while you drive, just keep in mind how much room you need to stop, not only to avoid collision, but prevent the boat from jack knifing or wrenching loose from its trailer.

Then, finally, think of the crew. Open hooks on the hiking proved fatal to one among us when the boat sank and drowned him as he slid up the shroud but no further then the point where the shroud entered the mast. Rule 13.31 says hiking gear must be able to disengage under pressure. Does yours?* If someone falls overboard from your boat, retrieval action is automatic. But when the someone is from another boat, get your thinking in gear for helping and away from racing. Man overboard drills should be a mandatory component to every spring practice session. Try it with the spinnaker up and the skipper letting go of the helm.

In addition to the buckets, anchor and anchor line, and paddle, a couple of well placed knives, one foreward and one aft, should be standard racing equipment.

One last word

When stepping the mast, ALWAYS check overhead for electrical wires, especially at away regattas. Regatta organisers, in an effort to find room to accommodate the travelling sailors, often select a site that is not free from this hazard. Even the best regatta organisers are not exempt from making this mistake. Following the 1984 U.S. Olympic Trials, Solings and Stars were hastily pushed into the street to make room in the lot for boats being pulled and came within inches of overhead wires before the danger was realised. Safety First is not just a cliche. It is a must.

*** Ed.'s Note:**
See new class rule 13.31, brought in March 1987.

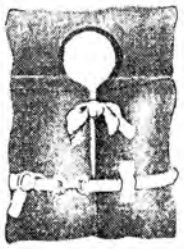
THE DIFFERENCE IN PERSONAL FLOTATION DEVICES

Offshore Life Jacket (Type I)

Offshore Life Jacket (Type I)
Best for open, rough or remote water, where rescue may be slow in coming. Min. Buoy. 22 pounds. *Advantages:* Floats you the best. Turns most unconscious wearers faceup in the water. Highly visible colour. *Disadvantage:* Bulky. It is interesting to note that the Type I, even with its minimum buoyancy of 22 pounds, is not considered enough for the mariners in the Coast Guard.

They don't use it, and have developed more stringent requirements for their own PFDs. Instead they use a "Standard Navy vest-type with collar," which has a minimum buoyancy of 32 pounds, which is the number recommended to keep an unconscious person's head out of the water. Recreational sailors would be smart to follow the Coast Guard's example, rather than to follow only their minimum requirements for on-board safety equipment; there is a vast difference between the two.

Throwable Device (Type IV)
Cushions, rings and horseshoe buoys. For calm, inland water with heavy boat traffic, where help is always nearby. Min. Buoy. 16.5 to 18 pounds. *Advantages:* Can be thrown to someone. Good backup to wearable PFDs. Some can be used as seat cushions. *Disadvantages:* Not for unconscious persons. Not for non-swimmers or children. Not for long hours in rough water.

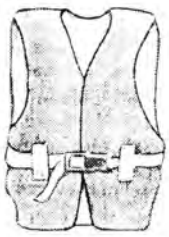


Near-Shore Buoyant Vest (Type II)

Nearshore Buoyant Vest (Type II)
Good for calm inland water, or where there is good chance of fast rescue. Min. Buoy. 15.5 pounds. *Advantages:* Will turn many unconscious wearers faceup in water. Less bulky, more comfortable than Offshore Life Jacket
Disadvantages: Not for long hours in rough water.

Throwable Device (Type IV)

Hybrid Devices (Type V)
Required to be worn to be counted as a regulation PFD. Min. Buoy. 22 pounds (fully inflated); 7.5 (deflated). *Advantages:* Least bulky of all types. High flotation when inflated. Good for continuous wear. *Disadvantages* May not adequately float some wearers unless partially inflated. Requires active use and care of inflation chamber. Performance level Equal to either Type I, II or III performance as noted on the label.



Flotation Aid (Type III)

Flotation Aid (Type III)
Good for calm, inland water, or where there is good chance of fast rescue. Min. Buoy. 15.5 pounds. *Advantages:* Generally the most comfortable type for continuous wear. Freedom of movement for specialised activities such as windsurfing, fishing and small-boat sailing. Available in many styles, including vests and flotation coats. *Disadvantages:* This device is not for rough water. Wearer may have to tilt head back to avoid facedown position in water. This device is not for use in cool or cold water, even in calm conditions, where the rapid onset of hypothermia may render the victim incapable of keeping his face out of the water.

Hybrid Devices (Type V)

Will not turn some unconscious wearers faceup in water.

YOU'RE OVERBOARD!

You're in the water: you went overboard, or the boat suddenly went out from under you. What now? Here's some good advice that applies whether or not you're wearing a flotation device. However, having one on - the more buoyancy the better-will make everything a lot easier.

1. Hold your breath and allow yourself to rise to the surface. Help by gentle movements if you must. Assuming you're clothed, there's a relatively warm film of water under your clothing and you want to keep it there. Further, most clothing traps air; that buoyancy will help you back to the surface and make floating easier. Move as little as possible, because it will cause loss of both the warmed water and trapped air.

2. Once on the surface, float on your back, relax, try to stay calm.

3. Look around for something that will support you out of the water. Having just your torso mostly above water will greatly increase functional time and life expectancy. Water conducts heat away from your body much faster than does air, so if you have a choice get out of the water as much as possible onto a piece of flotsam.

4. No way out? Evaluate the way you're floating. Add some more air to your clothed upper body area by exhaling into the chest area, or air by lifting the bottom of your shirt or jacket above water and then quickly pulling it back under.

5. While most clothing will aid buoyancy in a chop or waves the water trapped in it (especially boots) may affect how well you ride. With easy movements take off boots or heavy shoes if you must and note the effects.

6. Keep the rest of your clothing on for insulation. Your internal temperature is 98.6 and as it drops (eventually to equalise with the water temperature), you will progressively lose both mental and physical abilities. Those losses become significant to your survival after a drop of only a few degrees.

7. You'll begin to feel chilled after awhile, and instinct will urge you to move to keep warm. Don't. Every movement accelerates the loss of heat you cannot replace.

8. If you can, hold your upper arms tightly to the sides of your chest, cross your forearms over your chest, draw up you legs and cross your ankles. This position closes off most major heat loss areas. It is effective while wearing flotation devices (although low-buoyancy units will require you to keep your legs extended), while lying on some wreckage, or even in a swamped boat.

INTERNATIONAL SOLING ASSOCIATION

ISA COMMITTEE

Full details of the current ISA Committee are listed in the latest *Soling Sailing.*
This information may also be obtained from the ISA Office – *see below.*

ISA SECRETARIAT

P.O.Box 2,
Bordon,
Hampshire, GU35 9JX.
UNITED KINGDOM.

Tel. +44 (0)420 472293 Fax. +44 (0)420 476067

Secretary/Treasurer: Mrs. Dinny Reed

HOW TO JOIN THE ISA

Each member nation of the International Soling Association has its own National Soling Association, and individuals should contact the NSA in their own country for details of membership. The contact names and addresses of these NSA's are available from the ISA office.

SOLING SAILING

The quarterly Class Magazine, "Soling Sailing", is circulated centrally by the ISA Office to all paid up ISA members.

Publication dates are as follows:
1st January, 1st April, 1st July, 1st October.

Anyone wishing to insert News, Letters to the Editor, Boat-for-sale advertisements, or any other material, should submit copy to the ISA office not later than one month before publication date.

Most photographs from 1991 European Championship, La Baule.

Published by The International Association, P.O. Box 2, Bordon, Hampshire GU35 9JX. U.K.
Telephone: +44 (0) 420 472293 Fax: +44 (0) 420 476067

Typesetting and Printing by Dragon Print Centres Limited,
18 Woolmer Way, Bordon, Hampshire GU35 9QF. U.K.

International Soling Association

PO BOX 2
BORDON
HAMPSHIRE GU35 9JX
UNITED KINGDOM