



Mainsail Trim Guide

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Haarstick mainsails are all-purpose sails, designed to be fast and adjustable in a wide range of conditions. They may be set for every situation, from light air and flat water to heavy air and big waves.

Shape setting depends on proper use of a boat's trimming controls. In the case of a mainsail these consist of: mainsheet, traveler, outhaul, backstay, checkstays and running backstays, Cunningham, flattening reef and slab reef.

Standard Length Battens

Tapered battens are included with both racing and cruising mains. Each batten is marked for its pocket and has an arrow pointing toward the luff or body of the sail. The batten should be inserted into the pocket to position the flexible (thinner) end in the body of the sail and the stiffer (thicker) end at the leech.

Transverse Battens

If your main is fitted with transverse (full length) battens you should make sure they are correctly installed and secured. Each batten is marked for its pocket and also has an arrow pointing towards the luff or body of the sail.

Slip the batten into the sail, making sure it seats securely into the end fitting at the luff (see batten installation info). Apply just enough tension to the tensioning strap to remove the wrinkles from the batten pocket.

Trimming Tips

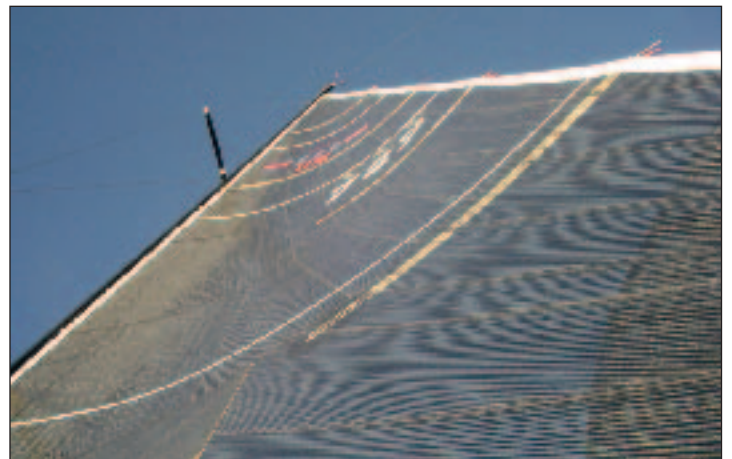
The following sections discuss trim controls individually and include some visual clues to help achieve proper trim.

Good mainsail trim depends upon interaction of the main with the headsail or spinnaker and with the balance of the helm. Communication between the helmsman and trimmers is vital to keep any boat performing optimally in changing wind and sea conditions.

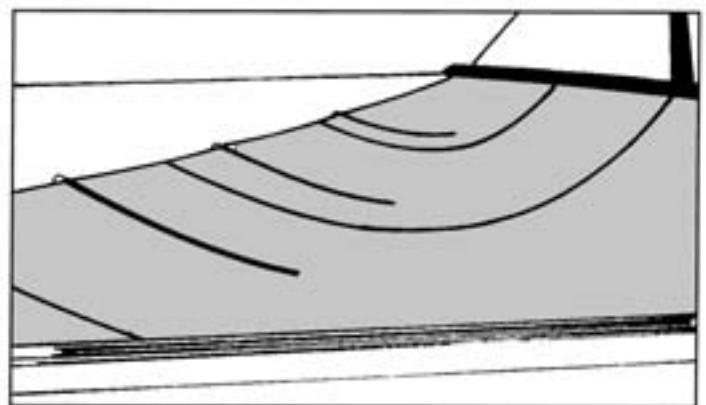
Mainsheet

The primary function of the mainsheet is to control twist or the variation in angle of the chordline at different heights. A secondary function is to set the angle of attach-the athwartship position of the boom relative to the boat's centerline.

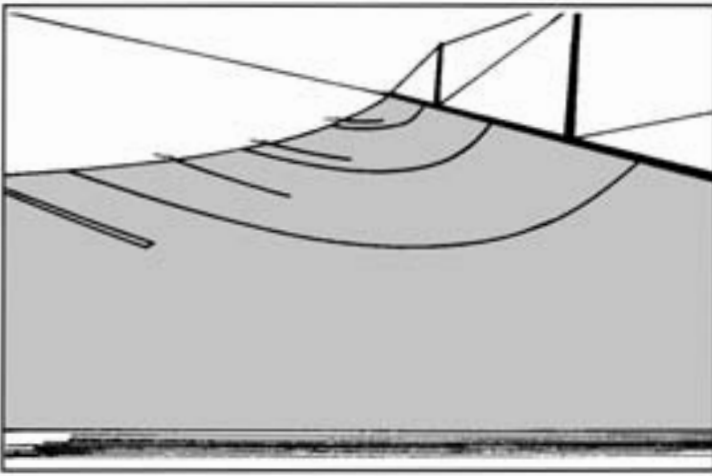
Think of the sheet as a primary power switch for the mainsail. Its range of adjustment is large and it has a significant effect on the overall power developed by the sailplan, and on the boats balance and helm.



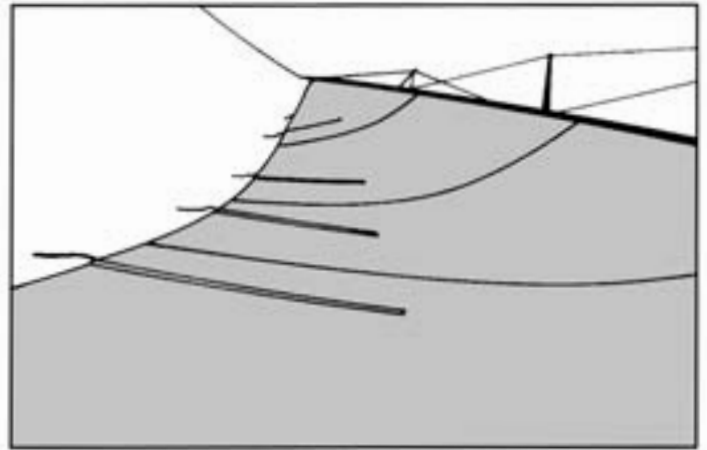
To check the twist, look at the angle of each batten compared to the boom. Upwind, in most conditions, the top batten should be parallel to the boom when sighting up the leech. A main with the top batten cocked to windward is said to have a "closed" leech. Conversely, when the top batten is tipped to leeward, the leech is "open."



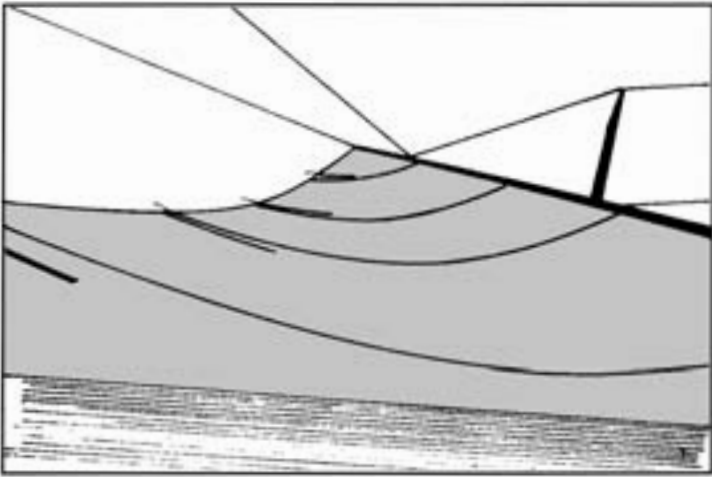
CLOSED LEECH – When the top batten hooks to windward of the boom, the leech is "closed". The telltales will stall most of the time.



CORRECT TRIM – The top batten is parallel to the boom, and the top telltale is flying most of the time. “Parallel” trim is a good starting point when setting up the mainsail for average conditions.

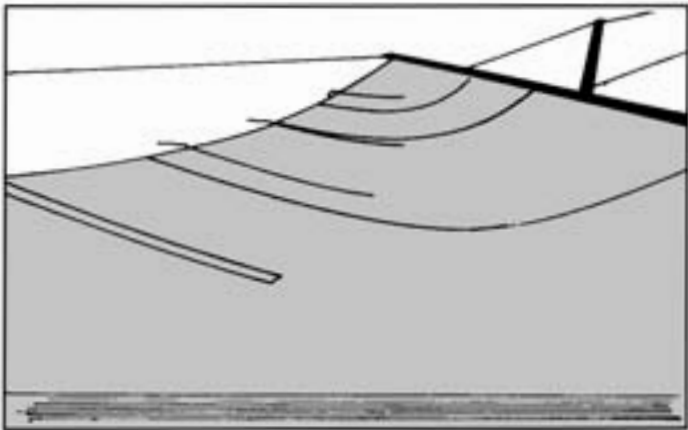


DEPOWERED – With the leech twisted and the top telltale streaming continuously, the sail is “depowered” for upwind sailing in breezy weather. Notice that the sail shape is much flatter, the result of increasing mastbend and Cunningham adjustment.



OPEN LEECH – When the top batten tip is to leeward of the boom and the top telltale flies most of the time, the trim is “open”. This is the correct setup when acceleration is important; such as after tacking, in waves, or with an in-experienced helmsperson.

Optimum twist varies from boat to boat, according to conditions. Generally, try to keep the top batten parallel. In flat water, easy steering conditions, or with a good helmsperson you can often sheet a little harder for better pointing. In rough water, very shifty air, footing conditions or with an inexperienced helmsperson, it pays to keep the leech open for extra power. Mainsheet trim must be coordinated with genoa or spinnaker trim for best performance.



FULL SPEED TRIM – In moderate air and small seas – “ideal conditions” – the main may be trimmed with the top batten slightly tighter than parallel. When speed falls or the boat encounters waves, the sheet should be slightly eased for acceleration.

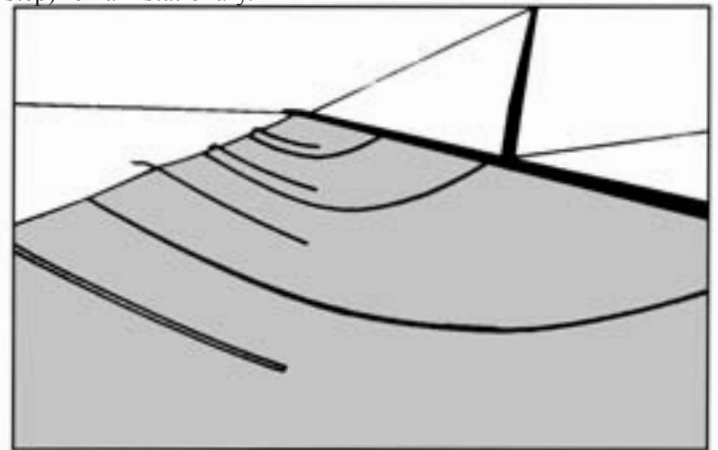
When acceleration is important (after tacking or in a chop or light air) ease the sheet and keep the leech open to prevent the upper section of the main from stalling. It is almost always better to slightly under trim than over trim a mainsail.

Haarstick mains have telltale material sewn to the leech near each batten pocket to indicate airflow at the trailing edge of the sailplan. These are good indicators of proper twist in any condition.

Sailing upwind, try to keep the lowest three telltales flowing smoothly. The top telltale may stall (stop flying) intermittently, especially in light air or choppy waves. As wind strength increases and the main’s shape flattens, the top leech telltale should fly smoothly most of the time.

Backstay & Mastbend

Mast bend affects chord depth, mainly in the upper two-thirds of the main. Bending the mast (by increasing backstay load) moves the middle of the mast forward while the hounds and partners (or step) remain stationary.



STRAIGHT MAST – Excess luff curve built into the main is absorbed as extra draft when the mast is straight. The upper leech remains tight and the sail is at its maximum fullness.

Mast bend has the following effects on sail shape: the luff moves away from the leech making the sail flatter, the leech opens, and the draft moves aft. Mast bend has a large influence on overall sail shape. As the backstay is trimmed to flatten the sail, other trim adjustments must be made to counteract the “side effects” of mast bend.

If the draft moves aft of 50% when the main is flattened via mastbend, an appropriate amount of Cunningham is needed to move the draft forward. Sometimes the leech becomes too open because of mastbend and the mainsheet should be trimmed to compensate. These are prime examples of the interactions required among sail trim.

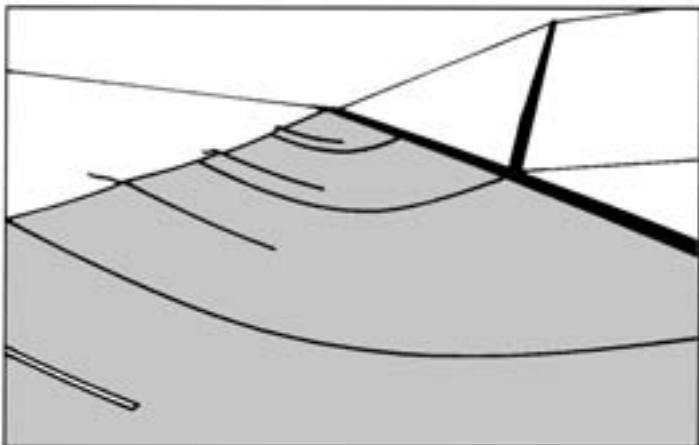
When mastbend exceeds the limit of built-in luff curve, the main will “blade-out,” then reach “overbend.” Overbend wrinkles, running from the clew to midmast, actually hinge the sail and invert the sail’s shape. While overbend is effective to control flogging for short periods, it is harmful to pointing ability, and should not be viewed as a long term sail shaping technique.

A racing main often needs some degree of mastbend in any wind and sea condition. A main which shows considerable backwinding, or which has draft jammed just behind the mast requires more mast bend.

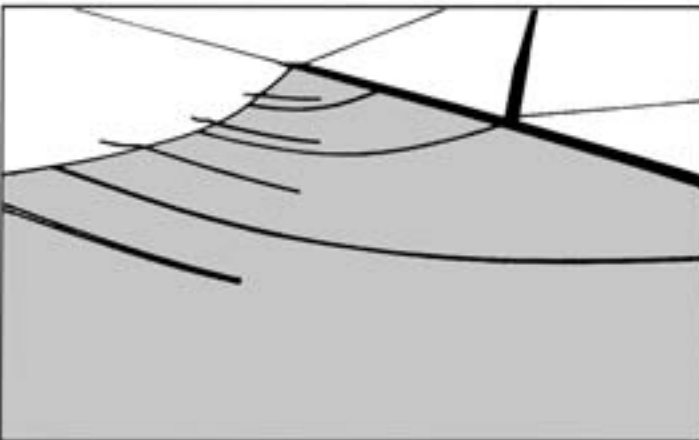
The running backstay is an additional control available on some masts, allowing fine-tune control of vertical mast bend distribution. Running backstays are beyond the scope of this discussion, however, our staff will be happy to discuss running backstays with you on an individual basis.

Luff Tension & Cunningham

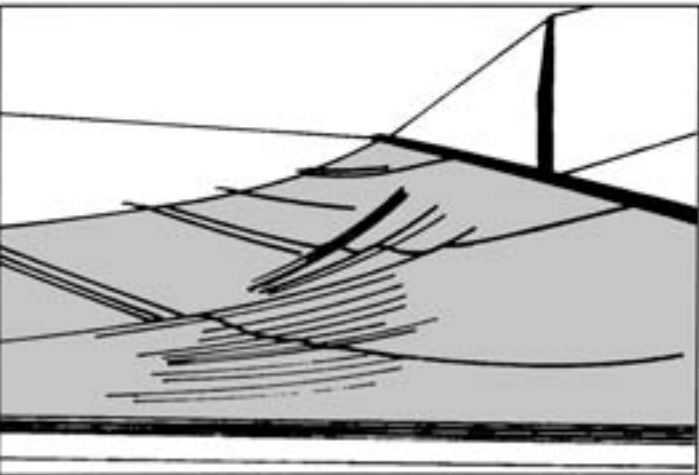
Your mainsail is designed to fit between the mast bands in “relaxed” condition with very little cloth tension. It may be necessary to ease the halyard an inch or two to achieve a soft luff in light air, particularly when reaching or running. Sailing to windward in 4-5 knots apparent wind, the sail should easily fit the full hoist length.



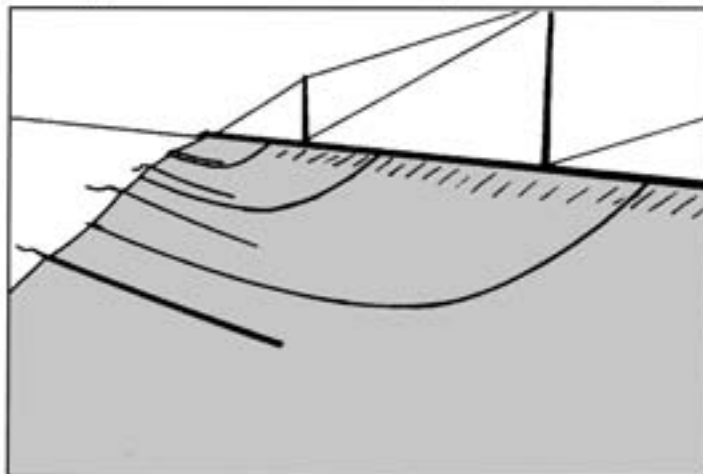
MEDIUM BEND – As the mast begins to bend, draft depth is reduced, draft location moves aft and the leech begins to open. This is the correct mast setting when full speed conditions exist.



MAXIMUM BEND – As the mast nears maximum bend, all the luff curve in the main is absorbed. Sail shape further flattens, the leech opens, and the telltales fly freely. This mast setting is correct for depowering without reefing, such as at the top of any genoa’s designed wind range.



OVERBEND – When mast bend exceeds the designed luff curve the leech hinges outboard, and large wrinkles form from the clew to the middle of the mast. This can be effective to reduce backwind, but is not a viable long term sail shaping technique.

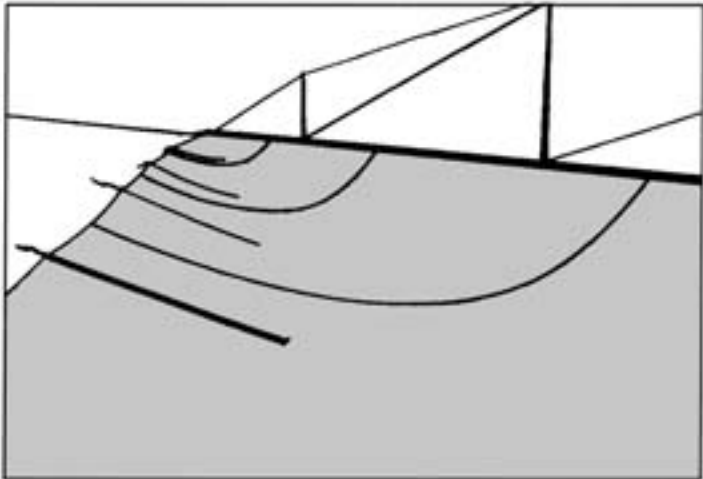


DRAFT AFT – A loose halyard/Cunningham is indicated by small horizontal wrinkles emanating from just behind the mast. This “soft” or relaxed luff is desirable as long as draft location remains forward of 50% of the chord length from the mast.

A Cunningham controls the fore-and-aft draft location in the mainsail. More Cunningham (or halyard) tension pulls the maximum camber forward in the mainsail. Easing Cunningham (or halyard) allows the position of maximum camber to move aft. Some cruising boats are not equipped with Cunningham tackle or a Cunningham ring. In this case luff tension must be adjusted by using the main halyard.

Use the minimum possible luff tension to achieve the correct mainsail draft setting. **AVOID OVERTENSIONING** the luff (indicated by vertical hard lines running along the backside of the mast). **THIS IS ESPECIALLY TRUE OF HIGH-TECH LAMINATE SAILS.**

As mastbend and mainsheet tension increase, draft moves aft in the sail. To offset this effect, luff tension must be applied to keep



DRAFT FORWARD – A tight halyard/Cunningham results in draft moving forward in the sail, producing a rounded entry and more backwinding. In extreme cases, vertical wrinkles appear behind the mast.

the draft at the desired for-and-aft location. Attempt to start with the draft approximately 45-50% aft of the luff on a masthead main, and 43-48% aft on a fractional rig..

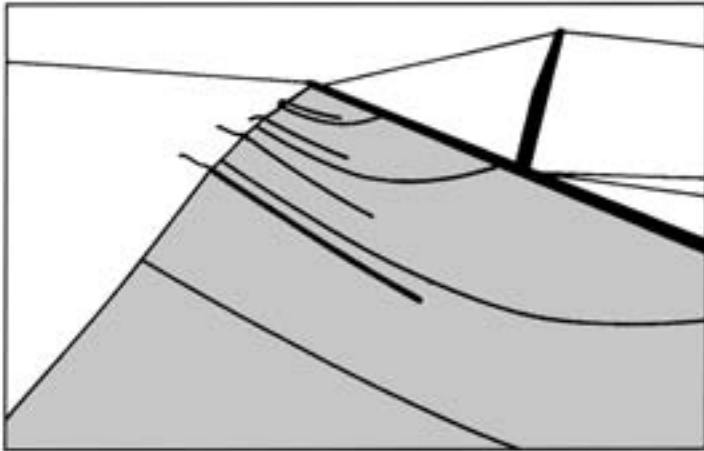
Outhaul

Haarstick loose-footed mains permit nearly unlimited camber adjustment at boom level. A large skirt of shaped fabric hangs below the boom when the outhaul is eased, giving the sail extra, unpenalized area for reaching and downwind work.

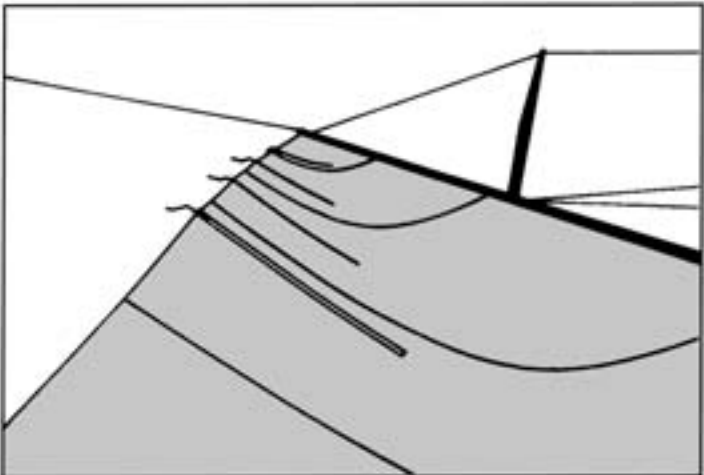
Outhaul adjustment on any main (loose-footed or traditionally footed) has two primary functions. First, it changes camber (depth of draft), with the greatest effect in the sail's lower third. The overall power a main develops and the amount of backwinding it shows has a lot to do with outhaul tension.

Second, as the outhaul is tightened, the leech flattens and the battens align more closely with the angle of the boom. This is an important technique to use when the leech appears to "hook", even though mainsheet tension is apparently correct. It's easy to see the relationship by standing directly behind the boom as the outhaul is being trimmed.

In medium air, sail upwind with the outhaul snugly trimmed, until the foot skirt just touches the boom. Lighter air calls for softer trim, heavier air calls for the outhaul to be trimmed to the maximum.



OUTHHAUL TIGHTENED – When the outhaul is pulled to maximum, overall draft flattens and the batten section “opens”. In winds above 12 knots, the outhaul should be pulled to the maximum.



OUTHHAUL EASED – When the outhaul is eased, overall draft becomes fuller and the batten section “closes”. The effect of easing the outhaul is most easily seen in the main's bottom third.

Downwind progressively ease the outhaul to open the skirt and increase camber at boom level. In moderate air (12 knots) the middle of the foot skirt should be eased out about one inch for each

foot of “E” dimension (mainsail foot length). A boat with a 10 ft. “E” will ease the foot approximately 10” in the middle.

Most one-design classes require a boltroped mainsail foot. We offer a “lens foot” option, which is a large piece of lightweight fabric, connecting the foot to the sail body. It functions basically the same as a loose foot, except that when the outhaul is eased, the additional fabric in the lens remains attached to the boom rather than falling below the boom.

Flattening Reef

The flattening reef is a reinforced ring set in the leech about 12 inches above the clew. It is used to flatten the bottom of the sail after the outhaul has reached full adjustment, by stretching the fabric between the Cunningham and flattener ring, removing all the shaping cut into the foot.

The flattening reef may be partially set, much like the Cunningham; or it may be pulled very tight to obtain maximum flattening benefit. Because its effect is greatest in the sail's lower third, the flattener is excellent for reducing main backwind at the top of any genoa's designed wind range.

Traveller

The traveler controls the angle of the mainsail relative to the boat's centerline and to the wind. It affects helm balance and flow of air over the sail's leech.

Never trim the traveler with the boom to weather of the centerline, when viewed from the backstay. Also, do not carry the traveler to leeward so much that there is a large backwind bubble behind the mast.

With these limits in mind, trim the traveler in concert with the mainsheet, so the top batten telltale flows most of the time. As mentioned earlier, a top telltale which never flows indicates the top of the mainsail is stalled.

When the telltale stalls you will tend to point higher, have more windward helm and go slower. Easing the traveler to leeward slightly reestablishes flow, reduces windward helm, allows the boat to sail faster but slightly lower. Watch your knotmeter and compass to determine the best traveler setting in any condition.

Reefing

When the power of the fully flattened main is still too great it is time to consider reefing. Tightening the backstay and Cunningham and outhaul and moving the traveler to leeward are methods used to depower the main. But when the angle of heel and/or backwind remain at unacceptable levels, even these adjustments aren't enough. You've got to reduce the sail's size by reefing.

To test overpowering, ease the traveler until the main is totally luffing and watch the knotmeter. If speed increases without affecting pointing ability the boat is overpowered and reefing should be considered.

Anytime you put in or shake out a reef, keep a close watch on the speedo, to check the affect of the adjustment. Another test of the need to reduce mainsail size is windward helm, which should never be more than 3 to 5 degrees. Opening the leech, easing the sheet, dropping the traveler and reefing decrease windward helm. Increases in windward helm and heel angle combine to hurt upwind performance in breezy conditions.

Experimentation and accurate record keeping are important to understand how trim adjustments are best utilized on a given sail. If you have any trouble finding the proper combination of adjustments with your Haarstick sails, call our service representatives at one of our lofts and we will be happy to help you.