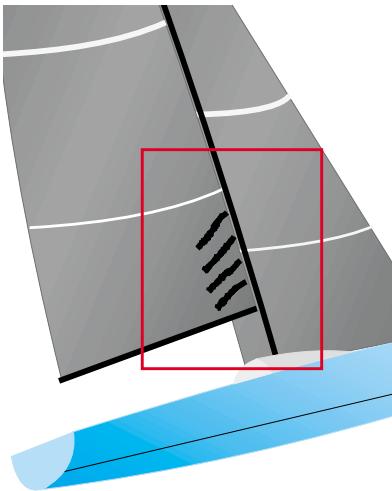


## **Mainsail** Trim Guide

Your new Quantum mainsail is designed and engineered to be easy to set and trim. Fundamental principals of mainsail trim are outlined in this guide. For more detailed information, contact a Quantum Sail Consultant.

## Halyard and Cunningham (Luff Tension)

The tension required along the luff of the sail is a function of apparent wind velocity. In more wind more tension is needed and vice versa. This means that you need to vary tension not only when the breeze changes velocity, but when you change point of sail. Since there is more apparent wind when you sail upwind you will need more tension than when sailing off the wind.



*Tension halyard or cunningham so that just the hint of wrinkles appear in lower third of sail.*

Hoist sail with minimum (hand tight) halyard tension. Sheet the sail appropriately for the point of sail (see section on sheet tension). With the sail now

loaded, tension halyard just enough to remove any horizontal wrinkles emanating from the luff. (Wrinkles will be at right angles to the luff.) In light apparent wind velocity you can leave just a hint of wrinkles. As velocity increases, wrinkles will reappear and additional halyard tension will be needed. Avoid over-tensioning. A vertical wrinkle or “gutter” parallel to the luff is sign of too much halyard tension.

Ease the sheet and boom vang when adding halyard tension. There is no point in fighting a fully loaded sail.

If you are trimming a racing main-sail, do not raise the head of the sail over the black band at the top of the mast, which delineates maximum legal hoist. If more luff tension is needed, use the cunningham to pull down and remove horizontal wrinkles. The halyard and cunningham do the same thing, provide luff tension, they just work from opposite directions.

If your mast is capable of bending, more bend will require more luff tension and vice versa. Add halyard or cunningham when adding mastbend, ease tension when straightening the mast.

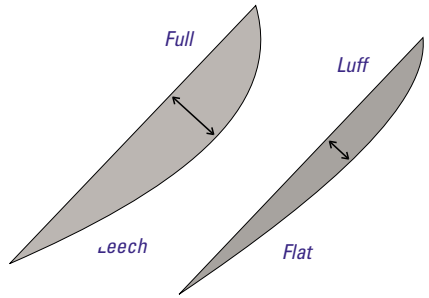


## Depth (Power)

The deeper (more curvature) in the sail shape, the more power it creates. In light to moderate apparent wind velocities, when the boat is not heeling too much, extra depth is desirable. When overpowered, heeling too much, and particularly when trying to sail upwind, a flatter sail shape is better.

A mainsail will become fuller if the leech and the luff move closer together; flatter if they move farther apart.

Simply imagine pushing two edges of a sheet of paper closer together, or pulling them further apart.

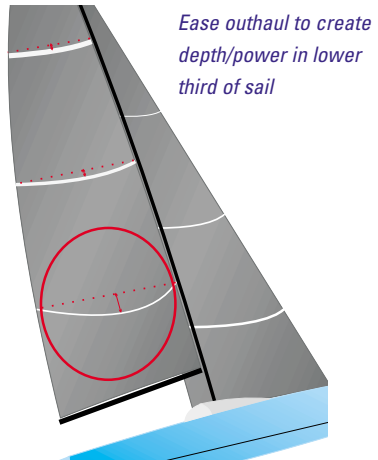


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## Outhaul

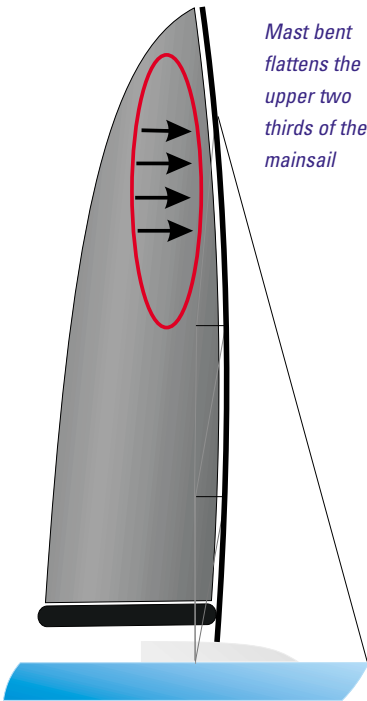
The outhaul controls depth in the lower third of the mainsail. Easing it adds depth and power, pulling on it flattens and de-powers. If the boat is heeling too far (enough to develop weather helm) add outhaul. Upwind, the mainsail should generally be flatter than when sailing off the wind, so it is better to use more outhaul. Easing the outhaul will round up the lower leech and help pointing in smooth water, light to moderate conditions. The outhaul is usually only eased all the way off (approximately 100mm from maximum tension) when sailing off the wind. In light to moderate conditions when you need power and helm, ease

the outhaul until the sail is 50-75mm from maximum tension, and the foot shelf is partially relaxed. Increase tension gradually as the breeze builds.



## Mastbend

Mastbend is created by the compression induced by the backstay on a masthead boat, or by a combination of backstay and running backstays on a fractionally rigged boat. When backstay or running backstays are tightened, the force is back, but mostly down, forcing the top of the mast down toward the deck. This compresses the mast much like



pushing on a straw standing on a table. The middle of the mast pushes forward, pulling the luff away from the leech and flattening the sail.

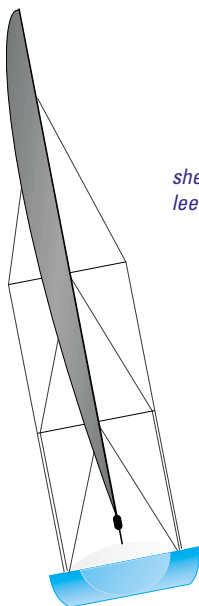
Mastbend controls the depth in the upper two-thirds of the sail. The same rules apply as with the outhaul. A flatter mainsail shape (more mastbend), will create less heel, reduce weather helm, and allow for more control. Flatter mainsail shapes work best when trying to sail upwind. In light to moderate conditions, particularly off the wind, a fuller shape (straighter mast) is appropriate.

Many racing or performance oriented boats have “checkstays” or running backstays connected lower down on the mast (usually 45-60% of the luff length). They keep the mast from bending too far when the backstay is applied. They allow the trimmer to add more backstay tension (to tighten the headstay), without over-bending the mast. A mainsail will develop “over-bend wrinkles,” radiating from the clew up towards the luff, if the mast is bent too far for the available luff curve.

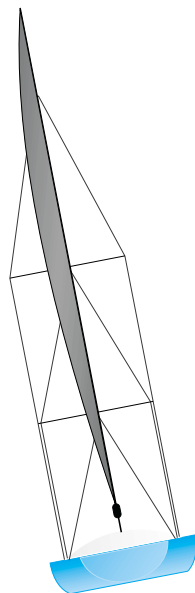


## The Mainsheet

*Top batten parallel,  
normal twist*



*sheeted hard, tight  
leech, minimum twist*



Sheet tension affects every characteristic of the sail. More than any other control, sheet tension will change substantially with changes in wind velocity and sea state.

On a reach the golden rule, “when in doubt, let it out” applies. Ease until the sail just begins to luff (bubble or backwind along its leading edge) and trim just enough to stop luffing. The mainsail will need to be eased further than you think. Do not be afraid to let the sail out until it is against the shrouds and spreaders (just make sure the boom vang is on tight enough).

For perfect trim on a reach, ease in every puff. Conversely, the sail will probably need to be trimmed in lulls. If the boat is overpowered (heels too much) in a puff, the sheet can be eased, allowing the sail to luff and spill excess power.

Off the wind the mainsheet simply moves the sail in and out of the boat, changing the sail's angle to the wind. Upwind, as the sail nears the centerline of the boat, the mainsheet begins to pull down, affecting the twist. Twist is the change in angle of attack from bottom to the top of the sail. It is a measure of



how open the top is relative to the bottom of the mainsail. Tightening the mainsheet tightens the leech of the sail (reduces “twist”), rounding up the back of the sail forcing the boat up into the wind and making it point. Easing opens the leech (induces “twist”), accelerating the flow of air across the sail, encouraging the boat to bear off and accelerate.

How far the mainsheet can be trimmed to help the boat sail upwind as effectively as possible is a function of wind velocity and boat speed. In more wind the mainsheet can be trimmed tighter without causing a speed loss, and pointing will improve. In less breeze,



be careful not to over-trim or the boat will not accelerate. Keep in mind another fundamental rule of sail trim, “speed first, and then try to point.” Start with the mainsheet relatively eased and gradually trim harder once the boat is up to speed.

Start with enough mainsheet tension so that the top batten is approximately parallel to (pointing in the same direction as), the boom. The top telltale will just be on the verge of stalling (disappearing behind the leech of the sail). In light air you will need a more open leech. The sheet will be eased from the median setting (so that the top batten points 5-10 degrees to leeward).

Finally, the mainsheet is the primary pressure relief valve when the boat heels too far. Ease and let the sail luff to let the boat get back “on her feet.” Ease whenever the heel is greater than 25 degrees on most monohulls, or whenever there is too much weather helm on any type of boat.

## Traveler

The traveler has two functions. It controls the boom’s angle to the wind, and it steers the boat, controlling helm

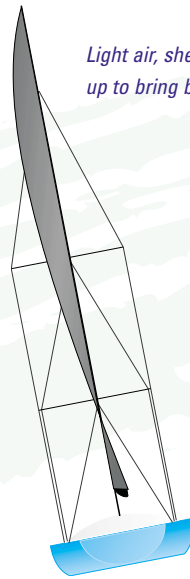
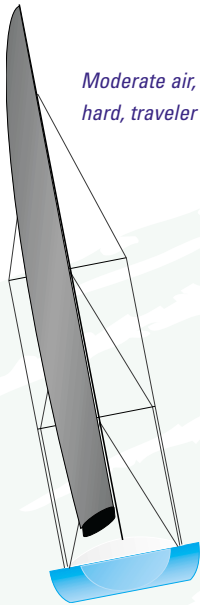


and heeling in puffs and lulls. Boom angle is a function of mainsheet tension. Set the twist with the mainsheet then use the traveler to position the boom on the centerline for maximum power and pointing, provided that helm and heeling are under control. This means that in light air when the mainsheet is well eased to promote acceleration, the traveler car will need to be up to weather to put the boom on the centerline. It is the position of the boom relative to the centerline that counts, not the position of the

traveler car itself. As the breeze builds and mainsheet tension increases, the traveler will gradually be dropped to keep the boom on the centerline and to de-power the boat.

The traveler is a wonderful means of fine-tuning the balance of the boat as velocity increases. Lower the traveler to control helm and heeling. When racing, play the traveler continuously to adjust helm in puffs and lulls. When cruising, find a happy medium that provides a good comfort level and keeps the boat from heeling too far.

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## Boom Vang

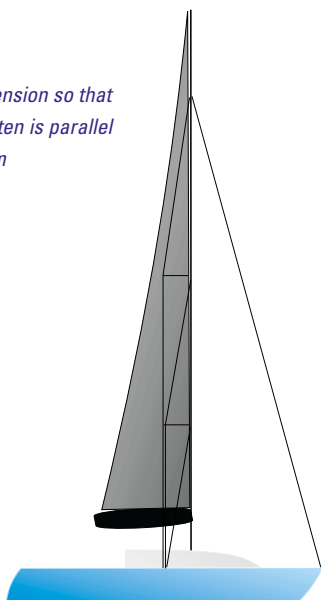
The boom vang takes over the job of pulling down on the mainsail clew and controlling twist when the boom is eased out for off-wind sailing. The same rule applies as for the mainsheet upwind; use enough tension to keep the top batten parallel to the boom.

Upwind in light to moderate conditions the vang is not used and is simply kept

snug. In heavy air upwind it can be used to help out the mainsheet with the job of pulling down on the boom and maintaining leech tension.

Pull the vang on hard and you can ease the mainsheet rapidly in big puffs to keep the boat on its feet without away the whole leech. This technique is referred to as "vang sheeting."

*Vang tension so that top batten is parallel to boom*



*Vang eased, too much twist*

