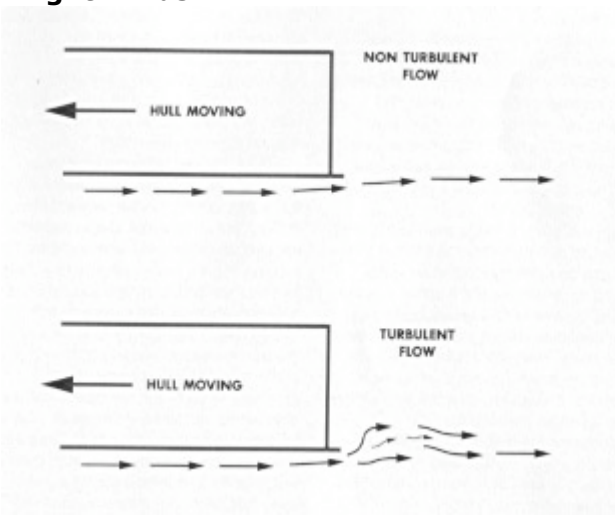
Trim & Boat Speed

Steve admits this is not one of those exciting aspects to our sport and is commonly overlooked. Why, it is much more exciting to talk about a new tiller or mast pre bend that makes a difference rather than where you plonk your weight on the side of the boat. In fact when I talk about 'Trim' sailors instantly think about sail trim. However, one area that is commonly overlooked is boat trim. Remarkably trim can make the biggest difference to boat-speed throughout the wind range and is usually the thing that separates the fast sailors from the slow ones. The concepts are quite simple to apply. but it is the one thing that can make a real difference to boat-speed all round the course. It is easy as a skipper to be always in contact with the feel on the rudder and be conscious of the required amount of heel on a boat, but the crews who are probably more in control of the trim of the boat from a weight distribution point of view, are trying to imagine the trim of the boat without this vital piece of information. When crewing, I used to take the tiller extension (extendable version) from the wire for a couple of minutes at the start of the day. This helped me get a feel for the required trim for the rest of the day or until the conditions changed.

The principle of trim is to balance out the forces acting on the boat through clever use of the shape of the boat and maintain the fastest underwater hull and foil orientations for all conditions.

When coaching his season, I have found that 'trim' has been an area where the 'big' improvements have been made by experienced and beginner sailors alike. This article will cover aspects like sitting forward in light winds to reduce wetted surface area to heeling to windward to balance out the rudder, and perhaps a little more mysterious magic:

· Fore and aft trim upwind
· Light winds



Quite simply the slower the boat goes the less the aft sections can support the weight of the sailor/sailors before the water flow off the trailing edge of the transom begins to get turbulent. Sounds a good word, but what it really means is that the water flows around the transom rather than off it.

Commonly most boats are designed with the sail controls in a comfortable position for medium wind sailing. Sitting in any comfortable position for light winds probably means you are too far back in the boat. Sitting behind the centre main for the skipper or on the seat for the crew is probably wrong. As usual there can occasionally be an odd arrangement. Crews in the 470 used to almost sit in the spinnaker bag to windward and the helm right behind the centre main. This was a way to increase the weight in the ends of the boat to stop the boat pitching in little waves (opposite of windy sailing).

A common problem in light winds is the lack of feel or weather helm on the rudder for the skipper. Briefly weather helm is the tendency of the boat to luff to the wind - normally the centre of effort of the sails are behind the centre of effort of the hull and foils.

Too little weather helm might make it more difficult to follow a lift and so point high to the wind. In lighter winds the sails/rig position tend to reduce weather helm and leave the sailor lost for the feel they are used to. The classic tendency then is to heel the boat to leeward to add more feel - the leeward heel changes the shape of the underwater hull making it turn to the wind. Unfortunately in most classes this is just slow due to increased wetted surface area and added drag from the transom! If instead they were to try to get their weight forward to sink the bow of the boat in, they would also be moving the boats centre of lateral resistance forward of the sails pushing force, creating more weather helm, without adding to the wetted surface area. It is also clear that using the hull to turn to boat to windward and the sailor trying to keep it on a straight line is simply adding extra drag in the equation. This is a typical problem in classes like 4000's where the crew and helm sit in very odd places to get the flat planeing sections of the transom out of the water. For my crew it was a quick dodge under the lowers and sit just beside the mast. Also a great place to view the Jib and its tell tails. Be aware that the crew might need a little warning to tack.

· Strong Winds
Comfort sailing rules OK. Just concentrate on not reducing the waterline length by sitting too far back in the boat and lifting the bow out of the water too much. Personally I sit as far forward as I can until the boat starts to feel like it is tripping over its bow and then I move back a little. Planeing trapeze boats can move the weight aft, increase speed and ignore the loss of pointing, even then the bow can be useful close to the water as it stops the boat being knocked off course by waves.

· Fore and aft trim downwind
· Light Winds
Yet again the principle is to reduce wetted surface area. Sometimes it is the heavier sailors that can get the bow well into the water to reduce the wetted surface area better than the lighter ones - commonly called the boats that can carry weight. Be concerned not to bury the bow to the detriment of waterline length, as this is one of the more important components in calculating the potential non-planeing speed of a

boat. If you are comfortable, you are probably not far enough forward. Check out the transom wake. If the water is not leaving the transom clean then move forward. Don't go hanging over the back to look at it get a friendly sailor to check it out can check theirs out at the same time.

· Medium Winds
A difficult area moving forwards as the boats starts to stop planing and backwards as soon as it starts to pick up. An old friend once said that he remembers being told to sit as far back as possible, - I guess he missed the 'until the wake gets disturbed', as he and his brother sat at the back of their mirror for a whole race and wondered why they finished at the back of the fleet. - It's a careful balance between sinking the transom and burying the bow

If you consider the effects of waves as well as, the movement backward and forewords things can get quite energetic to keep the boat on the plane. Talking to the Olympic Silver medallist from Savannah, Sebastien Godefroid of Belgium, says he cannot understand why some Finn sailors use anti skid strips on the aft side tanks, "if I cannot move then I am slow!" I can remember racing downwind at Anzio in the 92 trials in a big, fast moving Mediterranean swell. I thought I was moving a long way forward to make the boat hook into the wave downwind - from the thwart to the spinnaker bag and pushing on the foredeck, until another competitor took a wave that took out half the leg from us. The crew had stretched onto the foredeck, just inches from the Jib tack and at just the right moment pushed the bow down into the bottom of the swell. I seem to remember feeling a little cross that this trimming had been a little illegal, but predominantly I felt just a little inferior!

· Strong Winds
Simply put - keep as far back as you can to keep the bow from nose-diving. Sometimes in extreme wind this cannot be back far enough. See Laser downwind at Hyeres slide sent by wife from home. Europe pic might be better?

· Sideways trim upwind.
· Light Winds
As discussed earlier, some find it easier to leave a little leeward trim upwind, especially in choppy waves. Chris Gowers is an exponent of leeward heel. His philosophy used to be that if the boat slowed down for an instant due to a wave or the wind, then he always had a little righting pump in the bank to get the boat moving again.
When there is enough wind to begin to almost sit out, then there is another trick that can be used to good effect - the gybing centreboard trick. Back in the 80's the gybing centreboard was one of the big boat park discussions that has seemed to gone away. Perhaps it is because I am not sailing those classes that permit it anymore. It was very effective when there was flat water allowing the centreboard/daggerboard to generate extra lift by moving the leading edge towards the wind by a few degrees. This effect can be made to work on a conventional daggerboard boat - but it is a little tricky, so get your head round this:

The Gybing centreboard Trick:
If you can heel the boat to windward a few degrees, remembering to sit far forward, then use positive rudder to keep the boat on its normal course. At first this rudder feels like a push, but as soon as the board begins to generate lift then the rudder becomes light and neutral, but still over to the positive direction. Effectively the boat now follows a straight course, inline with the rudder in its positive direction. This means that the rest of the boat, including the board is now turned into the wind - effectively gybing to windward. Now every dog has its day, and this trick is very useful for extra height for squeezing a boat to windward and can be used for long periods if the boat speed does not drop. However, once there is a lull in the wind or a slowing wave, the effect can be catastrophic. Perhaps then the Chris Gowers' style would gain back some ground.

· Medium Winds

The typical problem when the wind gets stronger than the sailor can correct for, is that the boat heels consistently. The rudder ends up behind the ear of the helm trying to correct for this weatherhelm. This is like tying a bucket to the back of the boat. The rudder is the biggest brake on the boat. Any library pic for this? In turn the rudder generates more weatherhelm as it lifts the transom out of the water, pushing in the leeward bow, making the underwater shape even more effective at generating weatherhelm. This problem is all a matter of style of sailing. In a two handed boat, there is lots of adjustments of rig available to reduce the weatherhelm, but still if you set out to sail the boat heeled to windward, then the problem largely goes away. It was generally accepted in the Laser that the boat would sail faster if the sailor tried not to lean out in such a way as to keep the boat heeled to prevent them from getting wet - better to concentrate on a good style that might not create so much leverage but would allow the boat to be sailed flatter. I always like to think of the rig as a weight that I would like to be on my side of the leverage equation. In boats with lots of freeboard such as the RS 300 this seems to work really well.

· Sideways trim downwind in waves
Reaching
When considering sailing in waves down wind, the hull form should be used to help the sailor remain in control of the boat when the waves come from the quarter, (windward stern area). One downwind style might be to balance out the forces on the rig with those of the hull and board for the least drag on the rudder. But the act of catching a wave requires more windward heel at the point of the quarter wave reaching the back of the boat, so as to prevent the increased heel making the boat screw into the wind - increasing the use of the rudder and therefore reducing the chance of catching the wave.

Bearing Away (onto a run or to gybe):
When you consider the natural forces on the boat, the bearing away action buries the bow of the boat, any

leeward heel on the boat makes the rudder a lifting plane which in turn buries the bow, making it even harder to bear away. To compensate for the rudder action, firstly remember to over ease the mainsail, giving a windward heel and then the rudder can be used to good effect to bring the boat back upright. At the same time the crew weight (that means both helm and crew if two handed) should move backwards, lifting the bow for an easy turn away from the wind. GYBE.JPEG. - weight back and slightly heeled to windward.

Tacking:

In many of the single-handers I have sailed, I have noticed the way the boat can quickly slow down in the process of tacking, largely due to the movement back in the boat around the traveller. This sinks the transom and acts like a break. To get around this I have found that tacking facing backwards keeps the centre of gravity of the sailor further forwards as the bum is heavier than the head. It has added advantages of ease of movement, don't have to bend so far to ovoid the boom, one foot movement and the weight moves further forward.

Bullet Point Guide
Light winds
· if you feel comfortable sit further forward.
· Try not to heel to leeward to gain feel, instead sit further forward.
· A little more wind, perhaps try and heel the boat to windward and start the gybing board trick

Medium Winds
· Remember the rudder is a brake, try to keep it central by balancing it out with the rig
· Move back as the boat starts to plane and forwards the moment it starts to stop
· When bearing away - sit further back and initiate the bear away with an over ease of the sail.

Strong Winds
· Down Wind - Just keep the bow out of the water!
· Upwind - too far back and the boat might start to skid sideways
· Upwind - too far forward and the boat will trip up on the waves