Sailing a Paper Tiger Catamaran

Paper Tiger Catamaran
GUIDES

Basic Upwind Sailing

This article was written by David Stumbles.
It was extracted from the 1997 Paper Tiger Catamaran Tuning Manual.

As most sailors would realise, the way in which the rig controls are adjusted and set is dependent on the wind strength at the time. This article is designed particularly for the newcomers to the Paper Tiger class and it will consider firstly, the adjustments to each of the primary controls for the various conditions that a sailor might expect. Secondly, this article will consider other aspects of upwind sailing such as boat handling skills and some basic upwind tactics. Additional information will be necessary as the sailor's skill level increases.

Settings and Controls

It is important for you to get your settings correct before the start of a race. The most obvious benefit to doing this is that your boat will be going as fast as possible right from the gun, leaving you to concentrate on sailing the boat rather than trimming the controls. Of course, conditions will often change during the race requiring further adjustments to the controls. However, as a general rule, conditions in the ten minutes prior to the start are generally quite similar to at least the first five minutes after the start.

Very light winds (less than 4 knots)

I have heard some sailors recommending that lots of downhaul be used in very light winds to flatten out the sail and to open up the leech (back edge of the sail). The leech does tend to hook (curl to windward) in these conditions. I tend to use less mainsheet tension to avoid this problem. The method that you employ will depend on the type of sail that you use. It is always a good idea to discuss the settings of a given sail with someone in the class who is going well with that type of sail. I use very little downhaul; just enough to almost pull out any wrinkles along the luff (front edge of sail). I set my vang so that the vang spanner (rotation lever) is about 45 degrees to the centreline of the boat. This is fairly standard for me in most wind strengths. I leave the traveller set in the centre, or slightly off the centre.

Mainsheet trim can be critical in these conditions. Too much tension will hook the leech and choke the sail. I believe it is better to use too little tension than too much in these conditions. The sail tell-tales are particularly useful when determining the sheet tension. If you get headed (where the wind swings so that you can not point quite as high) and the boat starts to stall a little, ease the mainsheet and bear away. Gradually pull the mainsheet back on to the original setting as your speed increases. I lie on the trampoline, just to windward of the centreline of the boat, in a position that allows me to watch the telltales on the forestay, looking occasionally at the sail to ensure correct trim. I lie as far forward as is comfortable to get the transoms out of the water and I try to keep as still as possible.

Light winds (4 - 8 knots)

Once there is enough wind to ruffle the water the mainsheet tension can be increased with the aim of getting the telltales on the sail flowing. A little more downhaul may be required to remove some of the luff wrinkles. This, combined with the added mainsheet tension, will mean that the vang will have to be tightened in order to maintain the 45 degree rotation (the boom is now lower). The traveller can remain in the centre.

I find that a sitting up position is more comfortable in these conditions, as you will need to watch the sail more carefully. Sitting up also allows you to shift you body weight quickly in response to a gust. Generally your body weight should be well forward, near the front beam.

Light to moderate winds (8 - 12 knots)

When it is possible to start flying a hull in light to moderate winds, a little more mainsheet tension will be required. You should try to fly a hull whenever possible, so don't hike out when the windward hull is still in the water. Flying a hull greatly reduces the wetted surface area of the boat and therefore the drag. This is a highly desirable situation. You may have to move slightly further aft to avoid digging the nose in to the small waves (just behind the rear chainplate). This also allows you to hike in response to gusts without fouling the sidestays. Trim the downhaul to remove wrinkles and adjust the vang to maintain the 45 degree rotation. The traveller can remain in the centre or just off the centre.

Moderate winds (12 - 16 knots)

When sailing in the moderate wind range the lighter skippers will be looking to de-power. Newcomers to the Paper Tiger class will tend to ease the mainsheet as a method of de-powering. Whilst this method of de-powering is effective while you are learning to sail, it is a slow way of sailing which uses much of the skipper's valuable energy and is therefore inappropriate for racing. By this I don't mean that I never ease the mainsheet. The mainsheet should be eased in response to a gust to de-power but not as a permanent method of de-powering. The other controls are a more effective means of de-powering. In fact, as a general rule, mainsheet tension should be increased as we go up the wind range.

In moderate conditions before the downhaul and traveller are brought into play as methods of de-powering, the use of hiking should be employed. Hiking is the act of hanging your weight over the side of the boat (the gunwale) to counteract the forces of the wind using the foot straps to support your body weight. The foot straps should be positioned so as to allow you to have the gunwale located somewhere between the bottom of your backside and halfway down your thigh with your legs slightly bent. Again, you will need to trim the downhaul to remove luff wrinkles, adjust the vang to maintain the 45 degree rotation and leave the traveller set in or near the centre.

Moderate to strong winds (16 - 20 knots)

Within this wind range nearly all skippers will be starting to de-power. Remember, don't use the mainsheet to do this, except in response to gusts. In fact, more mainsheet tension will be required to avoid sail twist, to keep the leech straight and to keep the boat driving forward. The two major ways to de-power involve the downhaul and the traveller. Increasing the downhaul tension will flatten the sail and open up the leech. You may also need to ease the traveller out depending on your body weight (anything between 100 and 200 mm from the centreline).

Some sailors depend on a cleat to hold their mainsheet in these conditions. This is a bad practice for two reasons. Firstly, you will not be trimming the sail in response to every gust and lull. Secondly, you are greatly increasing your chances of capsizing, as you may not be able to quickly uncleat the mainsheet when a large gust hits you. You will also need to hike that bit harder in these conditions. If you find this tiring, don't worry. As you sail more in these conditions you will attain a certain level of 'sailing fitness' and it will become easier.

Strong winds (20 - 25 knots)

Safe sailing and de-powering will be the key to your survival in strong winds. More downhaul and mainsheet tension will be required. A good downhaul can really de-power the sail and make the boat sailable in these conditions. You should have the traveller eased to around 200 - 300 mm. You will know if you have the traveller and downhaul correctly adjusted because you will be able to sail with the mainsheet on hard (virtually block to block) and just de-power using the main for the big gusts. Of course you will have to hike very hard. To give yourself a break every now and again, just

ease the traveller and reduce the effort expended from hiking. You may have to hike a little further back to avoid the nose of the leeward hull digging into the waves too much (over the top of the centreboards is generally a good position). Adjust the vang to maintain a rotation angle of between 30 and 45 degrees.

Rough guide to settings and controls for various conditions

Wind conditions	Wind strength (knots)	Mainsheet tension	Downhaul tension	Vang spanner rotation	Traveller from centre (mm)	Body position on boat
Very light	0-4	Eased	Pull	45°	0	Lying/centre well forward
Light	5-8	More	the	45°	0	Sitting well forward
Light to moderate	8-12	Moderate	wrinkles	45°	0	Ready to hike
Moderate	12-16	Fair bit	out	45°	0-100	Hiking close to sidestay
Moderate to strong	16-20	Lots	Fair bit	45°	100-200	Hiking harder
Strong	20-25	Very hard	Heaps	30°-45°	200-300	Hiking further back

Boat Handling Skills and Tactics

Not only is it very important for a sailor to have the primary controls set correctly (as outlined earlier in this article), but it is also critical that the skipper maintains good control of the boat in order to obtain maximum boat performance. Control of your boat is a skill that will ensure that you get upwind as quickly as possible.

Boat control

I have already detailed where you should be positioned on the boat for various wind conditions, which is a major factor affecting the control of your boat. I have also stressed that you should avoid using a cleat for your mainsheet system. A good ratchet block is sufficient to ease the load in all conditions. Newcomers often ask how it is possible to pull in a lot of mainsheet without a cleat. This can be easily achieved by sailing with the tiller extension positioned across the front of you rather than beside you. This way the steering hand may be used as a cleat to hold the mainsheet while grabbing another handful of rope. Additionally, this method is also handy when you need a spare hand to adjust another control. You simply hold the mainsheet and tiller in the one hand and use the other to make adjustments. Whilst sailing upwind I wrap the mainsheet a few times around my hand to avoid it slipping out. Having it slip out accidentally will dump the sail and cause the boat to slow right down (you may also end up with a trailing boat climbing over your back beam).

Using telltales upwind

Once you have your controls set, you should be able to sail using the forestay telltales. To position these correctly, they should be attached at about eye level when standing beside the boat on the shore. Always attach them to the upper front stays, not the lowers, as these lower stays are often slack and consequently flop around which makes it difficult to read the telltales. Use a piece of cassette tape that is long enough to be tied to the forestay (I use a round turn and two half hitches) and they must reach back almost to the mast. You can steer to these telltales by keeping them pointing back at the mast or slightly to windward of it, but not more than about 100mm. This is a good safe guide to your correct sailing angle upwind. If you are unsure as to your settings and your other controls, use the telltales on your sail as a further guide to correct boat trim. You should aim to have the leeward sail telltales flowing and the windward ones flowing or just lifting slightly.

Steering
You should aim to steer as smoothly and precisely as possible. Excessive movement of the rudders will only slow you down. It is better to make large adjustments with the mainsheet in response to a gust rather than alter course too much.

Other boats
Always be on the lookout for other boats. Be aware of what tack you are on (port or starboard) and your rights in case a give way situation occurs. For instance, you must at least know the most basic right-of-way rule: a port tack boat must give way to a starboard tack boat. If this does not make sense to you, get someone to explain it to you as soon as possible. If you do look like having to avoid a starboard tack boat, you will generally have two options. (1) tack, or (2) bear away and go beneath the starboard tack boat. In most situations it is generally better to bear away and go beneath as tacking is slow and usually positions you in the starboard boat's dirty wind. If you go beneath, bear away early and move your body weight back on the boat as you will now be close reaching. Cut close to the stern of the other boat, but do not make the passing manoeuvre too fine in case the other boat stalls or hits a wave. If you allow plenty of time to pass beneath (so that severe rudder movement is avoided) then you should not lose too much ground at all. As you get more comfortable on the boat you will be able to look behind you and underneath the boom to check for other boats without wandering off course - you should practice doing this.

Tacking
A lot of ground can be lost through poor tacking. Stalling the boat (getting stuck in irons/head to wind) is something to be avoided, as it will really lose you a lot of ground. A successful tack takes some skill and preparation, although it becomes very automatic after you have been sailing for a while. Firstly, you must have plenty of speed (relative to the conditions). You must check to ensure that you won't foul anyone during or immediately after your tack. Be definite with your steering. Once committed to the tack, go for it. Keep the tiller pushed across - don't let it come back to the centre, as this will definitely stall the boat. Ease the mainsheet as the boat goes through head to wind. Ensure that the mast spanner has moved across to the new side. Sheet on slowly as you start off on the new tack.

Stalling
If you do get stuck in irons, you will have to reverse the boat out of it. Do this by positioning yourself on the side of the boat that you want to be on at the end of the tack. Ease the mainsheet right out and push the boom across to the opposite side (away from you). Push the tiller away from you as well. This will make the boat go backwards. As it reaches the point of being about 45^{o} to the wind, straighten the tiller and pull in the mainsheet slowly.

Which way do I go?
If you are new to Paper Tigers, your best bet is to try to stay with the faster boats, especially on the first beat. Most of the time they will be sailing in the best part of the course. You may occasionally get a wonderful lift by heading off by yourself, but you won't learn anything by it. By sticking with the bulk of the fleet you can easily gauge your speed relative to the other boats. If you are in the ballpark, be content with this and just try to sail as best you can. If you appear to be slow, review your primary sail settings and compare them with those boats around you. Always be aware though that slow speed out of the start may be due more to bad positioning (being in dirty air from other boats) than from incorrect settings.

Lifts and knocks
This is a very complex subject. If you don't believe me, try reading "Advanced Racing Tactics" by Stuart Walker. However, you can apply some very basic principles that will hold you in good stead most of the time. On coastal lakes, most breezes are oscillating, meaning they shift around about a mean direction. They will vary slightly, most of the time, but they will maintain a general direction.

A lift is a clockwise shift when you are on starboard tack and an anticlockwise shift when you are on port tack. It allows you to point closer to your destination (when sailing upwind). In the early part of a beat, a lift is nearly always desirable. A lift becomes undesirable when you have reached the layline (see definition below) and wish to tack back to the mark. Ideally, you shouldn't be on the layline until you have sailed most of the upwind leg. A knock is the opposite of a lift. A knock will force you to bear away, meaning that you are losing ground to your desired destination, the windward mark of the course. Generally, it is best to tack when you get a significant knock. As I stated earlier, this is a very complex subject. Trying to explain it in detail would take many pages. Being aware of these simple guidelines will help you to understand why the sailors around you tack when they do.

Laylines

If you sailed on a starboard tack from the start line, you would eventually reach a point where the windward mark was about 90^{o} to the centreline of your boat. If you tacked at this point, you should be able to reach the windward mark. This is called the layline. If you kept going on the starboard tack, you would go past the layline and when you eventually tacked, you would have 'overlaid' the mark and would approach it on a tight reach, rather then beating. Of course, the opposite applies if you left the start line on port tack. Always be aware of where the mark is so that you don't overlay it, as this wastes valuable time.

Dirty air

Dirty air is the common name for the disturbed air produced by a boat as it sails along. It is also known as a boat's wind shadow. It is of extreme importance to avoid another boat's dirty air, as it is slow to sail in this disturbed air. A lot of newcomers to sailing think that the wind shadow from a boat only occurs directly downwind from its sail. Whilst this area is part of it, the shadow also stretches back from here by a couple of boat lengths. The real trap though, is the wind shadow that extends straight back behind the boat about three to five boat lengths and slightly (a boat length or so) to windward of this line. It can appear that you should be getting clean air, but you can be getting quite disturbed air, resulting in you dropping back away from the boat ahead. Be aware of this. It can often explain another boat's apparent burst of speed.

Covering

Whilst classic covering involves trying to put another boat into your wind shadow to slow it down, the more common form of covering involves protecting your position from the boat or boats behind. If you round the last mark in front of a boat, the best way to ensure that you are still in front of it at the finish is to stay between that boat and the finish. Sounds basic, right. Well it is fairly basic, but most people don't do it effectively. If you are truly between the boat and the finish mark, you can protect your lead even if the other boat gets some advantageous windshifts. In fact, being in this position normally results in you getting much the same windshifts as the boat being covered. The difficulty comes when you are trying to cover two boats and they head off on different tacks. You should generally choose the boat you need to beat the most, or the better of the two boats as it may teach you some things. Whilst covering is another subject that could be dealt with in much more detail, these basic guides will help the newcomer.

For assistance with your Paper Tiger Catamaran, or suggestions for this or other Guides, please contact the Paper Tiger Catamaran International Association:
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