

## SECTION 2

### **EXERCISES FOR LIGHT AIR, MEDIUM & HEAVY WINDS**

**Light: 2-8 Knots or 1-4 m/s**  
**Medium: 8-15 Knots or 4-7 m/s**  
**Heavy: 15+ Knots or 7+ m/s**

### **LIGHT AIR EXERCISES**

#### **GOING SAILING IN LIGHT AIR 2-8 Knots or 1-4 M/s**

##### *Exercises on the Water for 1 boat*

##### **Tacking**

Aim – perform 10 really good tacks in a row

What to look for – smooth roll, with the rig moving from one side to the other without any wobbles

How – crew crossing in front of the mast vs crew crossing behind the mast

Who – division of tasks, break them down into small units

Practise half the tack first by rounding up to the head-to-wind position and then falling back to the original course. Usually the skipper will say something like – ‘ready to tack?’. It’s a good idea for the skipper to wait for an acknowledgement from the crew (‘ready’) so that you both move together. Analyse who is going to move first and how much. So that minimal rudder is used, the boat should be heeled to leeward first, helping it to round up. Practise this a few times until you’ve got it smooth. **Tip** – take one big step across the boat instead of several small ones as this has a bigger effect in less time.

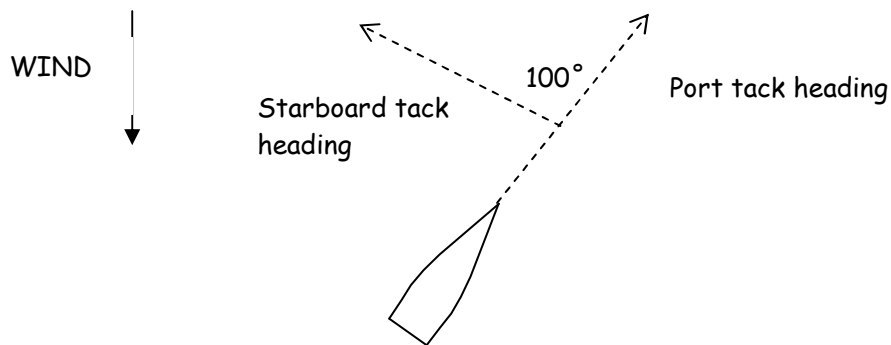
When you’re happy with half the tack, go ahead and complete it. Usually the turn in the first half of the tack is a bit slower than the turn out. As the boat goes past head to wind, the skipper settles the boat onto it’s new course which may be a few degrees lower than necessary so that you can build speed. This is only desirable in 4kts and under, above this there is no advantage in turning the boat past the ideal windward course.

There is co-ordination required between the forard hand and skipper so that both the jib and main are eased a little going through the tack and are brought on together as the boat settles onto its new course. The main will probably have to be sheeted on quite sharply so as to ‘pop’ the battens through. Do this at the same time as bringing the boat upright in quite a quick movement but it’s really important to keep it smooth. For maximum effect, the boat should be brought upright at the same time as the sails are sheeted on as this will give maximum acceleration up to full speed. In light air, it is a good idea for the skipper to handle the mainsheet through the

tack.

*Maybe series of stills from tacking video?*

#### INCREASED TACKING ANGLE IN LIGHT AIR



In 2-4kts (1-2m/s) you can expect to tack through an angle of around  $100^\circ$ . As the breeze increases, the angle will decrease so that in 5-8kts (2.5-4m/s) you should be looking at  $90^\circ$ . The best way to guess this angle is for the skipper to take a look over his/her shoulder before the tack and pick a point on the shore that is about where you'd expect the bow to be pointing after the tack.

The skipper should always be facing forward during the tack and as the bow approaches the point you have picked, slow the turn down and bring the rig upright. If you don't have a shore as an indicator, use the jib as a reference point, so that as it fills the boat stops turning. Your tack in light air will be slower than in stronger breeze. It is really important not to turn the boat too far, otherwise you waste a lot of time and distance coming back up to course.

As a guide, in 2-4kts (1-2m/s), the time taken to tack (full speed to full speed) is around 12 seconds. In 5-8kts (2.5-4m/s) it decreases to approximately 8s. If the water is rough then it takes a little longer.

*Photos - sequence showing angle of heel through the tack*  
*DVD - 29er association footage*

## Gybing

Aim – perform 10 really good gybes in a row

What to look for – smooth roll, with the rig moving from one side to the other without any wobbles

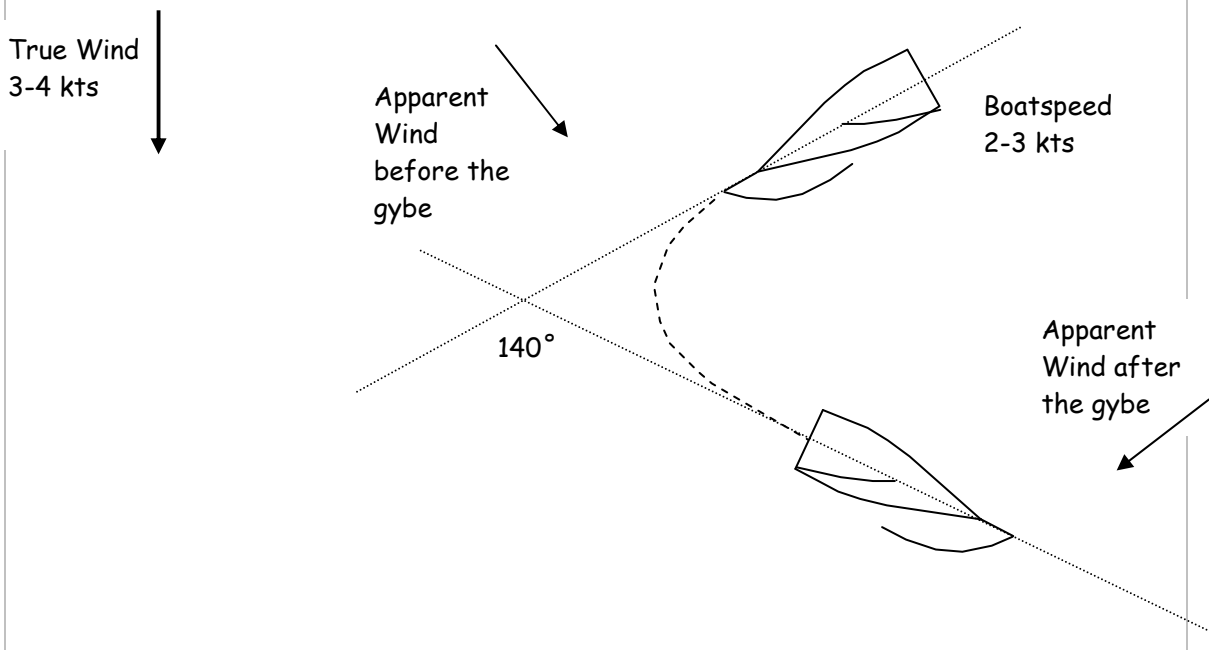
How – keeping the spinnaker full

Who – division of tasks, break them down into small units

No matter what the manoeuvre, always aim to perform it smoothly. The only thing that changes as the breeze increases, is that the time taken to perform the action will decrease. Imagine someone looking directly along the centreline of the 29er and watching the rig move across the skyline. It should be steady at all times and during tacks and gybes, the rig should move in a smooth arc, particularly in light air so that the airflow across the sails can stay attached and generate power.

Light air gybing is quite easy, providing you understand that the angle of the breeze changes as you swing the boat through the gybe.

Try a simple exercise taking the boat through a gybe slowly and then more quickly. You will find that in very light air your gybing angle will be around  $140^\circ$ . As you take the boat through the gybe slowly, the spinnaker will collapse, the boat will slow down and it will take quite a long time for the sails to fill with air again. But if you swing the boat quickly through the gybe, holding the spinnaker until it backs before allowing it to fall past the forestay and set on the new gybe, you will maintain your speed for longer. You will also find that once you are settled on the new gybe you will be able to bear away a few degrees.



The lighter the breeze, the more critical it becomes to understand Apparent Wind. This is because the boatspeed you are generating downwind will often be greater than the actual breeze strength, so the direction of the wind will change substantially as you sail along. This is why the mainsail almost never gets eased right out, even when the wind is coming from behind.

Your wind indicator at the top of the mast is a very useful guide as to the direction of the apparent wind, so it's a good idea to have something up there that is quite sensitive in light air.

Coming back to gybing in light air, as you turn the boat downwind and through the gybe, the boat will slow down and the apparent wind will then change substantially back towards the True Wind direction. So it is really important that the turn is smooth and consistent, otherwise the spinnaker will collapse and it will take a very long time to build boatspeed again.

It should take no longer than 1½ to 2 seconds to go from a full spinnaker on one gybe, to a full spinnaker on the new gybe.



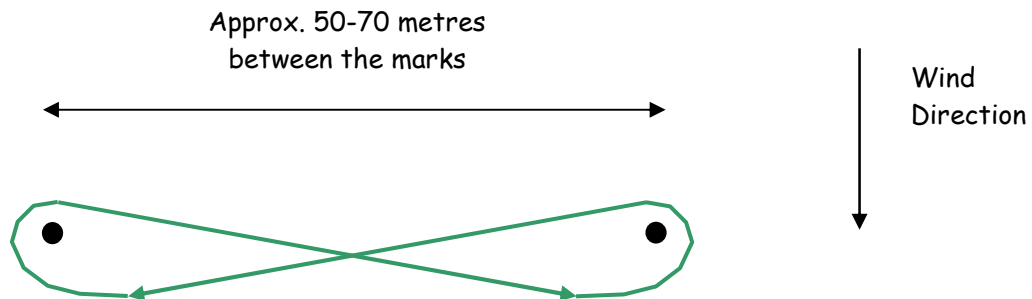
*Note the gybing angles in this photo, in approximately 6-7kts (3-3.5m/s). The slightest change in pressure up or down will affect the angle you can steer. VMG's are critical. **Velocity Made Good** refers to the quickest path between 2 points and is always a trade-off between speed and depth (or speed and height upwind). If you can keep your crew on the trapeze, you will always go faster than another boat sailing deeper with both crew sitting in. But you will sail extra distance as you sail the boat higher (and away from the next mark downwind). Does the extra speed make up for the extra*

distance? Usually it does, it can be deadly to sail directly towards the mark downwind without planing.

**Mark rounding** – figure eight

Many places can be won or lost at marks, so it's a good idea to include mark rounding exercises in your training program.

*Equipment required: 2 floating marks with rope and weights on them*



Drop the two marks across the breeze, approximately 50-70 metres apart. The stronger the breeze, the further apart you should make them. It doesn't matter if they are not anchored, so long as they drift downwind at the same rate.

Start sailing between the two marks in a figure of eight. Pay particular attention to your entry and exit from each mark. This exercise is to raise your accuracy with your rate of turn and how close you can shave each mark and finish your turn at exactly the right instant so that you don't have to correct your course to be aiming at the next mark. When you think you've got that under control, reverse the direction. Then bring the marks closer together. You should definitely raise a sweat with this exercise but concentrate on trimming your sails perfectly after each turn so that you come back to full speed as fast as possible.

When you've mastered the turns, and if the breeze is still light (less than 8kts or 4m/s), try hoisting and dropping the spinnaker between each mark. This will give you a really excellent idea of how much distance it takes before you have to go for the drop. You should be able to reduce your times so that it takes you around 7 seconds to hoist and set and 4 seconds to drop.

### **Rudderless sailing**

This is great fun but should only be attempted when you have a good space of water around you and it isn't too cold!

The aim of the exercise is to learn to steer the boat with the sails and the angle of heel of the boat rather than using the rudder. Every time you use the rudder, it creates drag, so if you understand what the mainsail and the jib can do, and also how the angle of heel influences where the boat goes, you'll develop a much smoother steering style using much less rudder.

Definitely don't try this for the first time in anything over 8kts (4m/s) of wind but you will need SOME wind.

After you've gone on the water and sailed some distance away from land and other boats, start off by raising the rudder in the rudder box so that only a fraction of it is in the water. Make sure it is tied to the boat somehow, so that if you capsize it won't float away.

*Pic of rudder raised in rudder box*

Bring the mainsail on, and leave the jib flapping. You'll find that the boat rounds up into the wind.

Then leave the mainsail unsheeted and bring the jib on (**tip** – let the vang off, otherwise it will deliver too much power to the mainsail). This time, the bow will be dragged away from the wind.

Use the angle of heel of the boat as much as you like. The more you heel the boat to leeward, the more the boat will want to round up. The more you heel it to windward, the more the boat will want to bear away. This is because the sides of the boat are curved and the boat will turn in the direction of the curve. If the port side of the boat is immersed, the boat will turn to starboard, and vice versa.

Your mission is to sail a straight line using only the trim on the main and the jib to steer. This will probably take a little while but it is worth persevering until you can do it. It may take several sessions. It will help if you also use your combined crew weight to make the boat go straight. If the boat keeps heading up into the wind, heel the boat to windward. If it keeps bearing away, heel the boat to leeward. The curved sides of the boat have a great influence on the direction the boat will go.

Once you can sail a straight line without using the rudder, try tacking and gybing. It doesn't count if it's accidental!

Then try going around a mark, sailing a short course, etc. I'm sure you'll have lots of laughs as you learn the subtle corrections that are required to make this work. It is a fabulous way of quickly learning the tools you have available to steer the boat.

Think of how you can use this – controlling the boat at the start, cutting the corners at mark roundings, quickly getting out of irons, steering the boat downwind just using angle of heel, using less rudder to tack, accelerating out of a tack, just to mention a few. In fact, this is a fundamental way of using perfectly legal kinetics to get your boat around the track.



*Make sure the water is warm!*



### **Blind sailing**

This is also good fun and also requires a bit of space! It's a great way to develop 'feel' and to learn to sail your boat fast without using your eyes glued to the woollies on the jib all the time. It helps with communication between the skipper and the forward hand, building trust and common terminology, a great team building exercise.

Once you're out on the water, start by blindfolding the forward hand. The skipper should describe everything he/she is seeing, including the gusts approaching the boat, how strong they are, what the angle of heel is (so that the forward hand can ease the main or not), other boats, etc. Then go through a tack, slowly. Give your crew the opportunity to find his/her way across the boat and back out on trapeze. Repeat the tack, building up to normal speed after half a dozen tacks or so. Then take a break.

Repeat the exercise with the skipper blindfolded. Now the crew needs to describe everything he/she is seeing, including whether or not the skipper is steering accurately and helping to bring him/her back on to course.

This is an excellent exercise for developing your other senses – hearing, balance, feeling the breeze on your face – and above all for quiet and precise communication between the two people sailing the boat.

As you get more adventurous, hoist the kite, gybe, drop and go around a mark. The more 'feel' you can develop, the faster you will go in all conditions but it is a particularly powerful skill to have for light air.

### *Exercises on the Water for 2-3 boats*

#### **Stop-start**

This is a great way to figure out how to get to top speed quickly after being stationary, as you might be before a start.

Line the boats up about 2-3 boatlengths apart. Make sure you are all stopped, as even having a little way on makes a big difference.

Let one boat try to roll the boat to leeward and bring the sails on as the boat comes back upright. Let another just sit across wind and pull the sails on slowly as the boat gathers speed. Time how long it takes to get from stopped to full speed and then talk about it between the two boats.

There isn't a definitive answer to this exercise, as different techniques will work in different wind strengths and wave conditions. But it is hugely

informative as to what is the best method and is incredibly valuable information.

**Tip** – if you are working with a coach, always stay close to the other boat so that the coach can talk to you both at the same time.

## **MEDIUM AIR EXERCISES**

### **GOING SAILING IN MEDIUM AIR 8-15 Knots or 4-7 M/s**

#### Exercises on the Water for 1 boat

#### **Tacking**

Aim – perform 10 really good tacks in a row

What to look for – smooth tack, with the rig moving from one side to the other without any wobbles

How – crew crossing behind the mast

Who – division of tasks, break them down into small units

As with the light air exercise, practise half the tack first by rounding up to the head-to-wind position and then falling back to the original course. Use the same words to indicate when you're tacking so as to maintain consistency with communication across all the breeze ranges. You won't be rolling the boat nearly so much as the breeze increases, as it is not a good idea to dig the chines into the water, as this slows the boat down too much. It's still essential that the forward hand and the skipper move together, but usually the crew has to start first as they have further to go from trapeze to trapeze. It may start with the forward hand unhooking him/herself from the trapeze and just hanging by their arm momentarily.

When you are satisfied with the first half of the tack, go ahead with the full tack. As the forward hand moves into the boat, have one foot on the cockpit floor and place the other foot right over on the other side, so as to be able to pivot facing aft as he or she grasps the new trapeze.

They will need to pivot facing aft so as not to get tangled up in the mainsheet which they will be taking with them through the tack.

The skipper must be quick to move as well, throwing his or her weight out on the new side as quickly as possible. Work carefully on the speed of the tack, if you're too fast, the boat will fall into windward dunking you both on the new tack.

You should be aiming to go from full speed to full speed to take around 7-8 secs when changing tack.

For the best results to maintain circular airflow in tacks, ease the jib and squeeze the main on as you go into the tack so as to move the Centre of

Effort aft and get the boat rotating more easily. It's all about using minimum rudder. The amount of jib to ease if you have a 4:1 purchase on the jibsheet is around 30-40mm at the clew (1-2 inches), that's 120-160mm 6-8 inches) at the cleat, then this will set you up for a fast acceleration as you come out of the tack. This is really important!!!

Squeeze the main on at the start of the tack for 2 reasons – if you ease the jib you need something to load the boat up, and secondly to move the Centre of Effort aft and load up the rudder, making the boat want to turn. The main will naturally ease as you go through the eye of the wind and the crew comes in.

### **Gybing**

Aim – perform 10 really good gybes in a row

What to look for – smooth roll, with the rig moving from one side to the other without any wobbles

How – keeping the spinnaker full

Who – division of tasks, break them down into small units

As for the light air exercise, the aim is to perform this manoeuvre with confidence and ease, so that you can gybe quickly to take advantage of a gust sliding past a couple of boat lengths away, or in close mark rounding situations when the breeze strength changes enough that you'll need to gybe in close quarters to maximise your boatspeed into the mark.

The quickest way to learn how to do this is to ask someone to show you.

Tacking downwind is like gybing any boat, it is very important to keep the boat under the rig. As you gybe, gauge the speed of the gybe to the breeze in the spinnaker. If you lose the breeze in the spinnaker, you will become unstable and have to react very quickly as the new breeze fills, the spinnaker snaps full and the load comes on the rig.

The forward hand should move first but should wait until the skipper gives the word. As he/she moves in off the trapeze, the skipper will pull away to keep the boat flat. Ideally, this will be the beginning of the gybe and the bow will continue to sweep downwind and through to the other gybe. The spinnaker sheet should be held firmly tight until the bow is through to the new gybe and the new breeze has flattened the spinnaker against the jib. Only then, release the old sheet and rapidly gather in the new one so that the spinnaker does not flap. The skipper will still be continuing the arc of the gybe and the crew will quickly be ready to hang out on the new trapeze, trimming the spinnaker to the new gybe.

The don'ts:

– don't hesitate once you have started the gybe. With the boat running

dead downwind and no breeze in the spinnaker, the wobbles will start and they are very difficult to recover from.

- don't make the rate of sweep of the gybe too slow, for the same reason.
- don't head up too quickly once the gybe is completed, wait for the crew to be ready on trapeze.

Do - steer the boat so that the rig is always above the boat, using the classis S as the boom flips across and then heading up onto the new gybe.

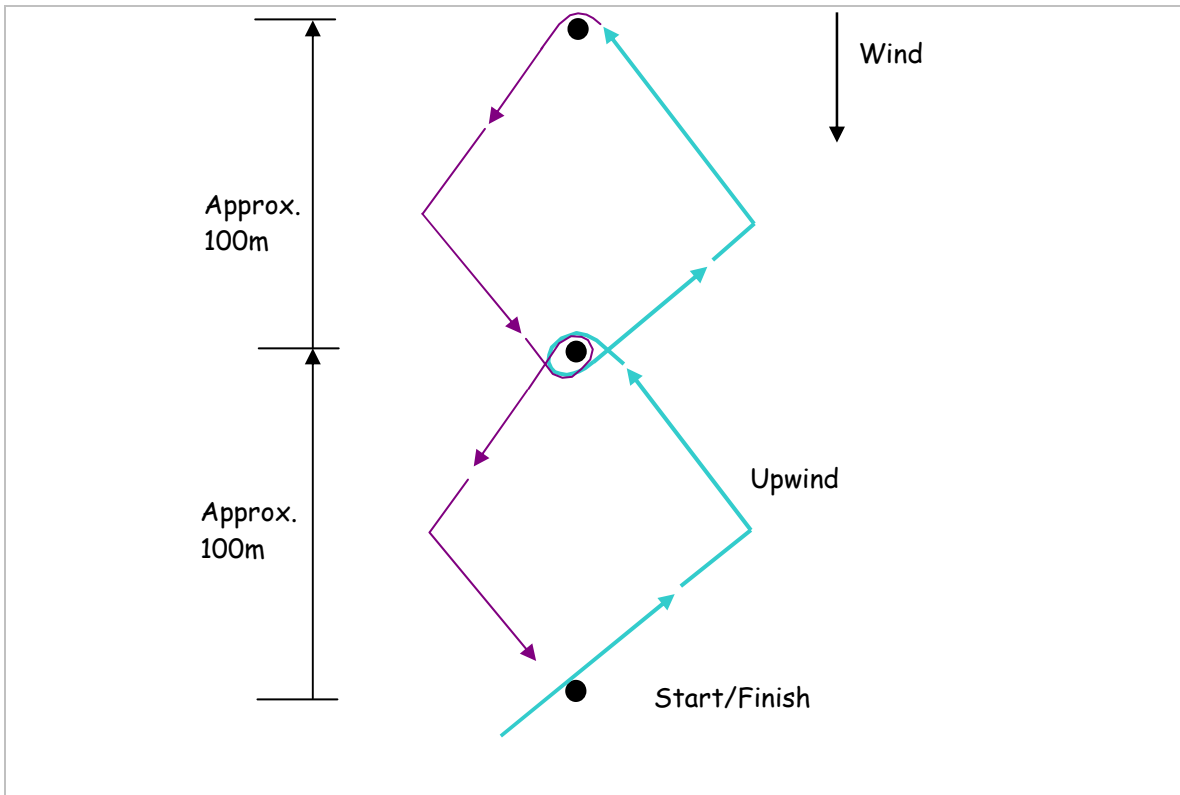
### **Killer Skills Test**

As you become more confident with tacking, gybing, setting and stowing the spinnaker, you might like to try this exercise. It is supposed to be more difficult than anything you will encounter in a race, so if you're not breathing hard, tired and haven't lost your temper by the end of this exercise, then you're not pushing hard enough! This exercise will stay with you for the rest of your racing career.

Equipment Required - 3 marks laid equidistant in a line downwind. Start with a distance between them of 100m.

Test - start at the most downwind mark passing it on port tack going upwind. Tack once so as to perfectly lay into the centre mark. When you arrive at the centre mark, go around it completely, coming out on port tack and going to windward. Tack once more so that you perfectly lay into the top mark. When you arrive at the top mark, bear away, set a spinnaker, gybe when you can lay perfectly into the centre mark. When you arrive at the centre mark, stow the spinnaker and circle the mark coming out on starboard gybe, set the spinnaker again and gybe once more perfectly laying the bottom mark.

As you feel more confident, increase the number of tacks and gybes between the 3 marks, or bring the marks closer together.



Exercises on the Water for 2-3 boats

**Starting Exercises**

For this exercise, you will need someone in a coachboat who can tell you how far from the line you are, or whether you are over.

Equipment – 2 marks laid across the wind, a whistle, starting watches

Test – set your watches for a rolling 3 minute countdown, so that you can do a minimum of 5 starts in a row. Then go for it. Set yourself different targets, such as starting in the middle, or at either end. The criteria you should use is that you start cleanly, without fouling any other boat, going full speed on the line at the gun.

Variations you can try are to shorten the line, lengthen the line (particularly good for practising mid-line starts), significant bias on the line for one end or the other.

Come back after 30 secs and line up again. After 5 starts, sail over to the coachboat and get feedback on the quality of your starts. Do it again, and again.

It is commonly supposed that the start accounts for 50% of the success in a race. It follows that we should spend a fair amount of time practising starts!

### 49ers at Lake Garda



#### Manoeuvring at Starts

One of the secrets to starting well is to learn to control the boat at very slow speed. Championship starting has a pattern where the boats line up a few metres from the start line with a minute or more to go. Being able to be part of that lineup, holding position without fouling the boats to windward and leeward is a vital skill to learn.

The slower the boat moves, the less effective is your rudder. If you think about your boat being stopped, it doesn't matter which direction you pull your tiller, nothing will happen.

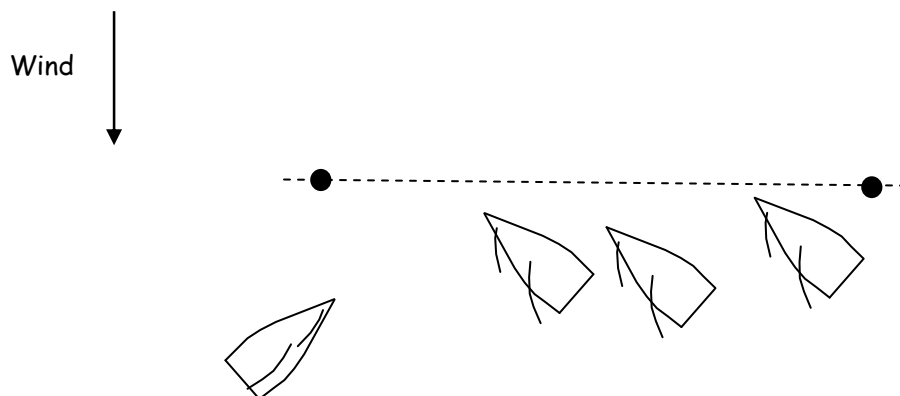
The most effective way to control your boat at stopped, or slow speed is with your sails and your weight.

If you remember back to the exercise of **Rudderless sailing** in the Light Air section, you will recall the different effect that the main and the jib have on the way the boat turns.

If you now think about lining up for a start, sitting a few metres back from the line, how are you going to control the boat?

The first place to start is to think about what is the fastest way to go from stopped to full speed. In 2-5 kts (1-3m/s) you will need to be sitting across the wind, above that your angle should be around 45° to the wind. Then it is crucial that both the main and the jib are sheeted on at the same time, so that their effect is to drive the boat forward. If the jib is sheeted on too

quickly, the bow will drive down; if the main comes on too soon, the bow will swing up towards the wind. Remember to have very little vang so that the leech of the main doesn't take over.



The forward hand has an extremely important task to keep the bow of the boat pointing at this angle. It is very easy to fall into irons (bow pointed directly into the wind and no pressure in the sails) so the jib will need to be backed or sheeted on to maintain a constant angle to the breeze. Don't forget how effective shifting your weight around can be to control the direction of the boat, you will need to be pretty active at this time.

Spend some time practising sailing slowly as part of your overall training for starting. You can use any fixed mark or fishing buoy in the water, anything that you can use as a reference point. Start off by setting a target of staying within one boatlength of the mark for 30s and gradually increase that amount of time in all wind conditions.

Practise tacking the boat within a boatlength – visualise the situation on the start line where a gap has opened up to windward and you want to close that gap with a couple of quick tacks. And always defend the gap below you, as this is the most important strategy to a clean, fast start.

### **Timing from stopped to full speed**

Spend some time working out the quickest way to full speed in all wind and wave conditions. This is the ultimate test of crew coordination and communication, as the best result will come from simultaneous movement and trimming of the sails. This is where swapping the main and jib sheets works well, with the forward hand taking the main as he or she swings out on the trapeze, with the skipper trimming the jib for the fastest angle to the breeze.

## **HEAVY AIR EXERCISES**

### **GOING SAILING IN HEAVY AIR +15 Knots or +7 M/s**

#### Exercises on the Water for 1 boat

#### **Tacking & Gybing**

Tacks and gybes should be practised in all conditions, for maximum confidence and performance of the manoeuvres. It is like someone practising their piano scales – it doesn't matter how good or expert they are, it is an exercise worth doing to keep your expertise up.

There isn't anything especially different about tacks and gybes in heavy air, other than that as with all other classes, you should seek to minimise them in racing as you will always lose 4-6 boatlengths every time you tack.

Remember that if you spend a lot of time capsized after gybing in 20kts, suddenly 15kts will look very easy. Similarly, to become confident in 20kts, you will need to practise in 25kts. There really is no substitute for getting out and doing it and if you really have trouble, ask someone to help.



*It happens to the best of us. Chris Nicholson and Daniel Phillips at the Bandol Worlds in 1998, which they won.*



### **Capsizing Tips**

The 29er is designed to turn turtle with the mast and sail acting like an anchor, so that the boat doesn't blow away from you when you capsize. However, this has the affect of taking longer to right and there is a definite technique so as to minimise the amount of energy you use up each time this happens.

It will take the two of you on the centreboard to bring the mast and sail up to the surface of the water. It is important that the mast and sail lie upwind of the hull. When the rig is lying on the water, leave the heaviest person on the centreboard and the other crew member should swim around to the other side of the hull and sit in the cockpit. If you are the one swimming around to sit in the cockpit, keep your weight low so as not to make it more difficult to lift the rig.

When all is ready, the crew member still standing on the centreboard should lean back with the help of one of the spinnaker ropes and bring the rig above the water. As soon as the wind gets under the sail, the boat will quickly flip upright. As the boat comes upright, the person standing on the centreboard should throw a leg over the topside of the boat and clamber into the cockpit. If this isn't possible, hang on tightly to the centreboard and go under the boat and pop out the other side, still holding onto the centreboard, as the boat will try to capsize again. This is where the crew member who has been in the cockpit, needs to release the jibsheet and grab the tiller so as to point the boat into the wind as quickly as possible. Help the other person into the boat and sail on.

Be aware of how tired you are getting when training in a breeze. There is no point in training when you are fatigued, as you will not be training properly. To start with, set a limit of how many capsizes you can manage, before heading to shore. Your fitness will improve quickly if you give yourself a chance to recover, then go out and do it again.

### **Launching & Returning to a Lee Shore**

#### Launching from a lee shore.

Typically, if you walk the boat out until the forward hand is chest deep in water, you may still not have enough depth for the rudder. However, insert the centreboard nearly all the way down and slide the rudder into the box and push it down as far as possible without touching the bottom.

The bow of the boat should be swung around until it is 50° away from the eye of the wind, the skipper should have both the jib and main sheets in his/her hand and pull them both on until they are just drawing. The forward hand pushes off and climbs on board, taking over the mainsheet. As the boat moves into deeper water, slide the rudder all the way down and off you go.

### Returning to a lee shore.

This is a bit trickier. It is a good idea to practise a couple of manoeuvres while you're a long way from shore.

Start two sail reaching then luff sharply so that the bow comes up to the eye of the wind. If you do this too slowly, you will capsize, so it is important that this is a very quick action. Practise this several times from slightly different reaching angles. The boat should stop in a short space but this can be aided by the forward hand jumping overboard while still holding onto the shroud.

Ease all the sheets while the forward hand moves up to the bow of the boat. This is a stable arrangement while the boat drifts backwards. The skipper will need to balance the boat, while also raising the centreboard and rudder.

When you come to do this at the ramp or the beach, as you are reaching in you might like to slow down the boat by hanging your foot over the side and easing the vang and cunningham. After you have luffed the boat sharply, the forward hand is at the bow and the boat is drifting backwards, the skipper needs to raise the rudder and centreboard and then drop the mainsail for maximum control when you finally arrive at the ramp.

If it is still too windy to do this safely, drop the mainsail before coming ashore.

### **Survival Sailing**

Some tips for getting the best out of your performance in a breeze:

- If you're struggling with gusts upwind, try raising the centreboard bit by bit.
- If you're still struggling, ease the vang to twist the mainsail. Having the vang too tight means the leech of the main is not easing enough as the gusts hit. You'll recognise it by being unable to keep the boat flat through the gusts and lulls and your speed will suffer. You'll have great height but it doesn't pay off with VMG's.
- You'll need to ease the jib to match the twist in the main.
- When you approach the top mark for the next downwind, ease the vang 300mm (12 inches) to allow you to bear away.
- Don't ease the cunningham as you bear away. Leaving it on tight helps to twist off the main.
- If there is a big sea running, you may need to flog the spinnaker as you come over the top of a wave to avoid submarining into the back of the next wave.
- Keep tacks and gybes to a minimum.
- Do not hesitate going through a gybe. Once you have started the turn, keep going but be careful to keep the boat under the rig.

