

The Mirror, Rigging and Improving Performance

Short notes to help you towards that
elusive goal of perfect performance.

Series One, Basic Improvements

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Here are some rigging tips for a standard mirror.

These tips contain improvements that are deliberately low cost, only a few quid on some bits of rope to make your boat sail better and importantly be a bit safer.

Many thanks to Matt McGovern, RYA Youth Assistant National Squad Coach (Mirror) and Northern Area Coach (Mirror) for the ideas that have led to these tips. Matt is also a previous winner of the UK Mirror Nationals.

I'll give an explanation on each tip as we go through.

Jib Forestay Tie off. Cost about 90p.

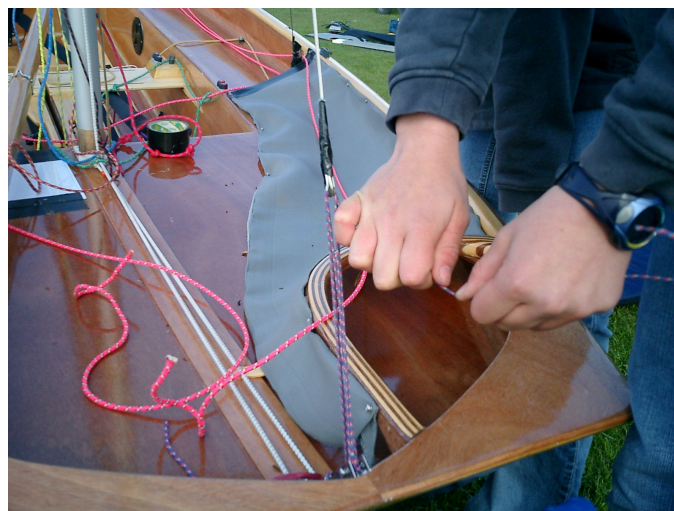
Get 1 metre of 2 or 3mm diameter rope (non stretch). If you have the old 6 mm grey rope cut it off and throw away. Tie on the front stay anchor point. Loop through the stay bottom eye three times with the last loop passing between the two others as it passes through the eye.

When rigging pull as tight as you can, with the last loop being between the two others you will find that it helps the tie lock off a little before you do a couple of hitches to tie it off.

Twang one of the back stays, you should get a low mustical note (a G apparently) when it is tight enough.

Safety – by doing this your rig does not flop around and will not be subject to snatching as you go through a tack or gybe. Snatching in high winds can impose very high loads on a stay and snap one very easily causing the rig to collapse.

Performance – Rig tension should be about 125Kg (about 25 on a Superspars gauge) on a Mirror (measured on a side stay at about chest height when boat on a launching trolley). The mast rake makes a huge difference to upwind and down wind performance although in a standard mirror there are usually only eyes rather than chain plates so it is not possible to adjust mast rake for different wind conditions.



Gaff Halyard cost about £8.00

For boat performance you want the gaff halyard to be as tight as possible with any knot or eye fitting snugly into the recess in the mast head sheeve.

7 metres of 4 or 5mm none stretch rope should do the job well.

In the second series we will show you how to put a loop in the rope to get it extra tight.

Performance – Having the gaff tight maximises the benefits you get from the kicker, downhaul and outhaul. To get the best performance you want the best aerofoile shape possible for the relevant condition and you will never achieve this if you use an old stretchy rope that cannot be pulled tight and locked off.

Safety – The biggest problem with the mirror is a breaking gaft halyard letting the gaff fall onto the heads of the crew below. The consequences are so serious it is one of the main selling points for the new rig currently under development.. There are various ways of tying off on the gaff band, here is one using a once round plus a granny knot.



For now, be safe and make sure that this rope is in tip top condition. We start with a 9 metre rope and trim a little each time it wears at the gaff band attachment position.

Mast Lacing – about £2.00

About 2 metres of 1 or 1.5 mm rope.

Performance. – You want the wind to get onto the sail as smoothly as possible so if you have a great lump of rope for your lacing you have not much hope. Lacing should be set so that the sail coming out of the bottom of the gaff runs straight down and parrell to the mast, not to tight so it is crumpled up against the mast, not so loose it pulls away from this position the mast in higher winds.

Safety – no safety points here except to protect your wallet. Tied off nicely protects the sail from creasing so increases its life.

Using gaff tape to protect your sails.

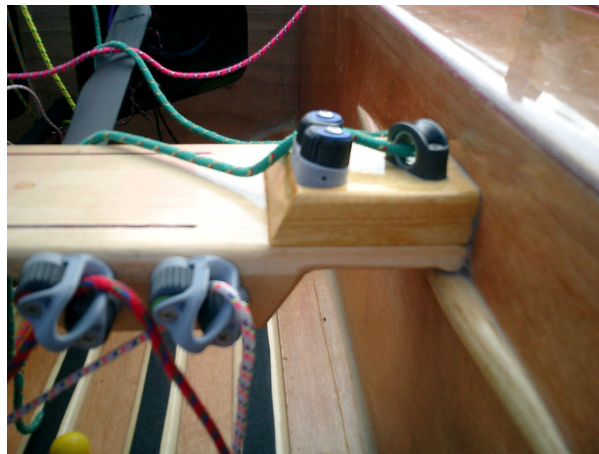
The metal bits on a boat, even some of the smoothest shackles have a habit of catching and tearing sails. Liberal use of gaffer tape does a protection job very nicely.



Down Haul

Set this nice and tight so that any diagonal creases are taken out of the sail.

Performance - In top racing boats this control line is taken back to the helm and crew to make it fully adjustable as shown here.



Outhaul

Set this before launching for the prevailing wind. You want about a fist width between the boom and the sail at its widest gap when you pull the boom in to beat up wind.

For normal sailing you only need to set this control line once.

Performance - In top racing boats this control line is taken back to the helm and crew to make it fully adjustable although there has been some debate on whether this is legal for this control line.

Kicker

The most crucial of all the controls this adjusts the bend in the sail at the top of the leech.

For normal sailing kicker on tight going up wind and off when going down.

The standard 2:1 kicker, which is the stainless steel 'in line' cleet is almost impossible to adjust when sailing up wind, particularly to unlock, so do your adjustments before rounding a mark.

Performance - Most boats change to a 4:1 kicker, the maximum allowed by the rules, as soon as they are used for racing and is brought back to the crew, even when hiking. A racing crew will adjust the kicker as often as one would adjust the jib sheet..

The kicker rope is subjected to high loads and high wear. Check out for wear each time you go sailing to avoid disappointment.

There are so many variations of this control I'll leave you to make your own choice.

Jib Sheets and cleats

As you head for more and more performance these sheets get thinner and thinner, down to about 4 mm. The old 10 mm ropes that we see are simply too heavy for this small sail.

The jib is used to smooth the air flow over the mainsail for up wind sailing.

You see many racing boats with the jib sheet cleats on the thwart (the bench). This helps up wind pointing ability, but your **sail must be cut to a shape to allow this**. For most older mirrors the cleats are on the side tanks. Unless you have got the right sails don't move these cleats to the thwart.

When sailing you need to control the shape of the jib and therefore the jib / main sail **slot** size to maximise the airflow. Jamming the jib on as hard as you can closes the slot and can stop the airflow on the back of the main sail.

Performance - For racing you will find an optimum jib setting and it is very useful to use a pen to put a mark on the sheet where you cleat it. From this optimum setting adjustment is only a couple of centimetres either side of this mark.

Jib Sail.

Many boats use shackles to connect to the chain plate. Depending on the type of detail we have found that doing this can put a small twist in the bottom of the jib which has an incredible effect on boat speed.

See the attached picture for a method using a single length of rope which when pulled tight does not twist the sail, but lets the tack of the sail twist gently into the wind.



Main Sheet

Again these get thinner as your performance improves down to about a 6mm rope.

Performance - The secret when sailing (beating) a mirror up wind is to ensure that you always have a vertical leg and an inclined leg from the boom block down to the transom. You impair boat speed if you sheet in so tightly that you make an A shape with two inclined legs.

Another tip is to move the main sheet block on the boom so that when the boat is rigged the block is directly above the transom. Most standard supplied boats have the block set a long way back towards the very tip of the boom.

Spinnaker

A standard mirror does not come with this sail so we will deal with this in the intermediate series of rigging tips.

Hull.

A properly shaped hull is important for good speed. Many older boats are out of shape due to warping, accidents and the like. Very difficult to change and therefore it becomes the reason for upgrading to a new hull.

However, for starter's find out if you have a problem.

Turn the boat upside down fit the foils and have a look for alignment. i.e. is the centre board in line with the centre line of the hull, is the skeg in line, is the rudder blade in line.

Adjust if you can.

Rudder

Fit the rudder out of the water with the blade fully down. The leading edge of the blade should be vertical and with fittings to get the leading edge as close to the back of the transom as possible. If not get your tools out and do some filing of the blade / adjusting. Using sand paper smooth the blade down to give the surface a mat finish to reduce water friction.

Old rudders have a bit of elastic to hold the blade down. This is out of fashion as you don't want your blade to rise up as you sail faster. Instead remove the elastic and replace with a rope and cleat so you can lock your blade down.

Centre board

Check for warping / twisting, the most common problem. Get in the garage and use clamps and flat surfaces to see if you can sort such issues out.

Check the quality of the elastic cord holding the board down. Look at the attached picture for a better way of tying the elastic.

‘insert picture’.

When in the garage bend the blade to check for minor splits in the blade where it comes out of the bottom of the casing. Cracking starts here from the vigours of righting the boat during a capsize.

When you are checking the hull measure the protrusion of the blade from the bottom of the boat. Have the blade protruding the maximum allowed under the rules assists with boat speed in windy conditions.

Repeat the blade finishing as for the rudder.

Safety – If you sail and capsize with a damaged board that snaps when trying to right the boat you are in serious trouble and will almost certainly fail to right the boat with out safety boat cover / help.