

Starling Foils

What is the fastest?

I often get asked which foils should I buy? Or get told why they are using an evolution foil vs a mackay foil.

The simplicity of it boils down to a few things:

- 1) Any foil is useless if they have any movement. Akin this to being in an aeroplane where the wing just wobbles the whole flight.... Unnerving right?
- 2) You want any foil to be the maximum width allowable (research chordline or formula for best foil shape)
- 3) Yes there are some differences to skinner boards vs fatter boards, and shapes of blades, but maybe not for the reasons you realise, and to be fair, any good sailor will make the shape 'look' fast if they just get a good start!

Remove the movement

Let's start with the most important thing. If you remove the movement of the foils (but still able to lift the centreboard in and out), your speed increase, and control drastically improves.

The easiest and best way to do this is to flip the boat over on its side on the trailer. Lay the mast on the ground on top of something soft. Put your centreboard into the centrecase. Head round to the other side and see how much the tip of the centreboard moves. At this angle the board will move up and down, but imagine if the boat was upright, this would be side to side movement. This movement disturbs the flow, and pressure differences generating lift to make the boat go forward.

If there is any movement, we need to remove it (you won't be able to remove it entirely, but 5mm of movement is a drastic improvement on 10mm or more of movement).

The class rules state this:

8.8 Centrecase slot width to be 19 +/-1mm. Centrecase openings to be rectangular shape with a maximum of 12mm radius in each corner. Centrecase top opening length (excluding buffer pads) to be 298 +/-6mm. Centrecase bottom opening length (excluding buffer pads) to be 375 +/-6mm. Slot fairing device under a trim on the centrecase top is permitted. Slot fairing device attached to the underwater surface of the hull or any water excluding device within the centrecase is not permitted. Buffer pads of maximum thickness fore and aft 15mm within the centrecase to protect the leading and trailing edges of the centreboard (i.e. not purposely shaped to act as a water excluding device) are permitted.

11 Rudder

11.1 Materials and design of stock, blade, tiller and extension are optional.

11.2 Rudder to be tilting type. Rudder blade must be able to tilt aft to a position where the leading edge of the blade is not less than 60 degrees from an extension of the vertical pivot axis of the gudgeons.

11.3 Distance measured in line with the vertical pivot axis of the gudgeons from the top of the deck at the fore and aft centreline of the transom to the bottom of the rudder blade when in fully lowered position shall be no more than 840mm. The width of the rudder blade shall be no more than 254mm.

11.4 The most forward point of the rudder blade when in fully lowered position shall be no more than 30mm aft from an extension of the vertical axis of pivot of the gudgeons.

11.5 The distance from the aft face of the transom to the centre of each gudgeon pivot shall be no more than 38mm.

12 Centreboard .

12.1 Materials and design are optional.

12.2 The centreboard must float.

12.3 The blade under the cheeks or stopper device must fit inside a rectangle 1067mm x 280mm and have a maximum thickness of 20mm.

Therefore, given these rules, let's look at the centreboard first. It can be any design, any shape, as long as it floats and is within the 3 dimensions given. Therefore the best way to remove the movement for the centreboard is to build the centreboard up to its maximum width of 20mm. An easy way of doing this is to put masking tape where the board exits the hull, and create a strip above that, with car bog, or filler or similar. Do the same for the top of the centreboard just under the stoppers. You need to ensure the board fully fits into a 20mm gap.

If after this, the centreboard still moves around a lot, then your case is likely to be more than the 19 +/- 1mm allowed. So you can pack the centrecase where required to achieved the width to fit within the rules.

As for the movement in the rudder, this can be from a number of points/sources

- The tiller extension joint is worn, loose: if so, replace!
- The tiller is not part of the stock, and therefore is removed each time. This means there will be movement and will wear down. The best solution is to glue/permanently fix the tiller to the stock. Even with a metal traveller, you can unscrew the traveller to remove the stock and tiller for measurement, otherwise leave the stock on the boat and just remove the blade each time you sail.
- Movement in the pintals. The pintals need to be securely fastened to the hull. The slightly heavier metal ones are worth it, as they are less likely to bend than plastic.
- The pintals in your gudgeons This is a super common one I see a lot. If the bushes in your gudgeons are worn, the stock just slops around. No good. Replace with new bushes ASAP.
- The blade moves in the stock. The key issue here, is most will put their rudder down when they leave the shore, and put their rudder pin in. This rudder pin (if the holes are not worn), will ensure the board stays down. However, the important part is to have a BIG wing nut on the side so you can clamp the blade in the stock well from the boat. The standard ones from mackay are perfect for this, allowing you to push on it with your whole hand.

Get the rudder vertical

Now this is a little more overlooked, and because most don't really know what they need vertical. The transom is not necessarily vertical when the boat is floating in the water, which is highlighted as most boats will have packers behind the bottom pintals attached to the hull.

The part of the rudder blade that you need vertical (when the boat is floating normally under flat conditions) is the maximum width of the blade. So the top of the blade might have the maximum width 20mm behind the trailing edge, but 75% of the way down the blade, the maximum width is actually 40mm behind the trailing edge. This gives the impression the blade is raked forward, but in fact it works best when this maximum width is vertical.

Devise a system for the centreboard

All too often, starling sailors are seen sailing upwind, and the centreboard has slipped up, and raked back. This has a huge impact on pointing, and speed.

It can be any system, but it just needs to work. The idea is to hold the centreboard down, and forward in the case. Then be able to quickly raise the centreboard just before rounding the top mark.