

Footrest modification to improve paddling efficiency

A 'flipper pedal' is a combined footrest and steering system used in some kayaks, where the left and right footrests are completely separate from one another. The general arrangement is two footrests (also called foot pegs) each with a hinged toe flap above which operates the rudder when pressed. A brand commonly used in New Zealand is OZO. This modification will probably work with other similar systems but may need tweaking.

OZOs are easy to adjust and work well, but in wider boats such as sea kayaks, their location close to the sides of the boat makes efficient paddling difficult. They are fine for general kayaking where speed is not an issue. However to undertake an expedition where covering long distance is important, or if racing, a steering system that places the feet near the centre of the kayak is better. It allows the knees to be central, which offers a better position for efficient paddling, using the strong leg and torso muscles.



Typical OZO footrest arrangement

An OZO footrest system has rails down either side of the hull on which the foot rests slide for length adjustment. Each is held in place with a sprung plunger that locks into the adjustment holes in



Footrest and toe flap assembly

the rails. Each footrest has a hinged toe flap above it which connects via a length of webbing to the rudder cables.

With the foot rests correctly adjusted, measure the distance between the ridges on the face plates of the footrests, and note the dimension. See sketch at end of article showing the forward projecting curved rail housing that forms this ridge. To make the



Removing the hinge pin

modification, take out the OZOs and disconnect the rudder cables. Use a thin parallel punch or a nail to knock out the pins that act as hinges. Remove the toe flaps and replace the pins and spacers to keep them together in case you ever



Pins back in for safe keeping

want to go revert to the originals, for example if you sell the kayak. Set aside the sliders that move along the rails. Eventually you'll mount the new footrest to the face plates of these.

For the new footrest, make a solid bar to go from one side of the kayak to the other. Cut the bar about 10mm shorter than the distance between the foot rest ridges that you measured earlier. I used an old 5 mm thick aluminium right angle extrusion and

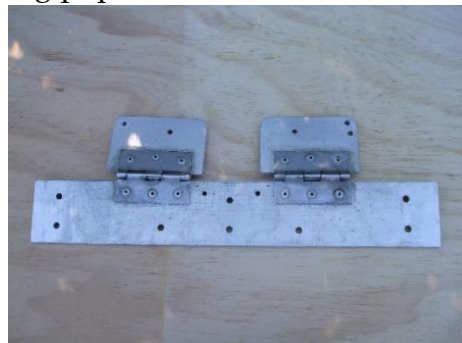


Extrusion section showing hinge and nib relative positions

shortened one leg to leave just a centimetre or so of 'nib' to give strength. It's a bit heavy, and 4mm would be better.

Make new toe flaps (I used 4mm aluminium offcuts) and hinge them to the bar in a suitable position. I attached the hinges using pop rivets but it would be better to use 316 stainless machine screws. If pop rivets corrode and break

they are a bugger to fix without workshop facilities. Attach the webbing straps that will connect to the rudder cables with a fastening similar to the way they were fixed to the originals. You then need to make a shock cord system to prevent the pedal flaps from flopping forward under the tension of the rudder cables. I tied new shock cords on to the existing in such a way as to keep the originals intact in case I wanted to revert to them later on. When adjusting the footrest by



Toe flaps attached centrally

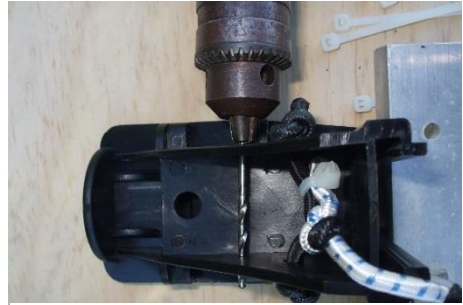


New shock cord added to original

moving it forwards, the taper of the kayak means the sliders get closer together, and vice versa. This means the bar footrest cannot be fixed solidly to the sliders. There's a simple way to allow this movement. The flat bar sits plumb on the faces of the sliders where you'd normally put your feet. The return nib of the angle section sits on the top of the slider (see sketch at end). Because the nib stops the bar from dropping down, you only need to hold the bar loosely in place.

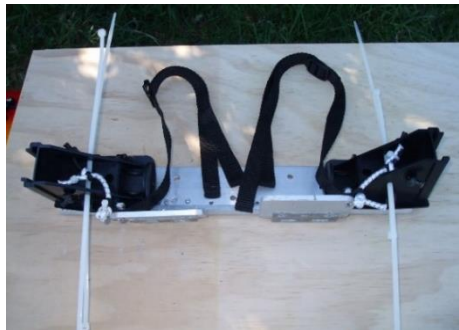
I used cable ties, two for each end. These allow for the lengthening and shortening of the distance between sliders when the footrest is moved. At this stage you have to do the only irreversible operation: to drill a hole through the sliders to take the cable ties. The hole size will depend on your ties.

Drill about 10mm behind the front plate of the slider. Poke the cable ties through the holes, one in each direction on each slider and loosely assemble the footrest, but don't thread the cable ties through their end grips yet.



Fitting the new footrest

Fit the sliders onto their rails. Offer up the footrest bar and hold it in position. Imagine the cable ties drawn up. Have you got everything correct? Is it all going to



The whole assembly

work? Have you got 5mm of space between each end of the bar and the ridge of the footrest front plate? Once you're convinced that it is all OK, pass the cable ties over the paddler's side of the foot rest bar and thread them through their respective end grips, doing up very loosely. Slowly go round the four ties, wriggling the bar to make sure it's in the right position. Gently tweak them up a little at a time. If you do them too tight the sliders will not be able to accommodate the

width difference as they are adjusted. If you get any too tight, snip them out and replace them. It's a bit tricky but worth taking time to do it right. You need to achieve a loose but even tension while making sure you hold the bar is position with the nib resting on the top of the footrest top on the slider. All the ties do is prevent the bar falling off and they need to allow sideways movement so don't do them up tight



Once installed, adjust the rudder attachments and check out operation. Once installed, the bar ties together the two sliders. This means that when adjusting the footrest it

must be done slowly – adjusting a little on each side alternately, so be patient.

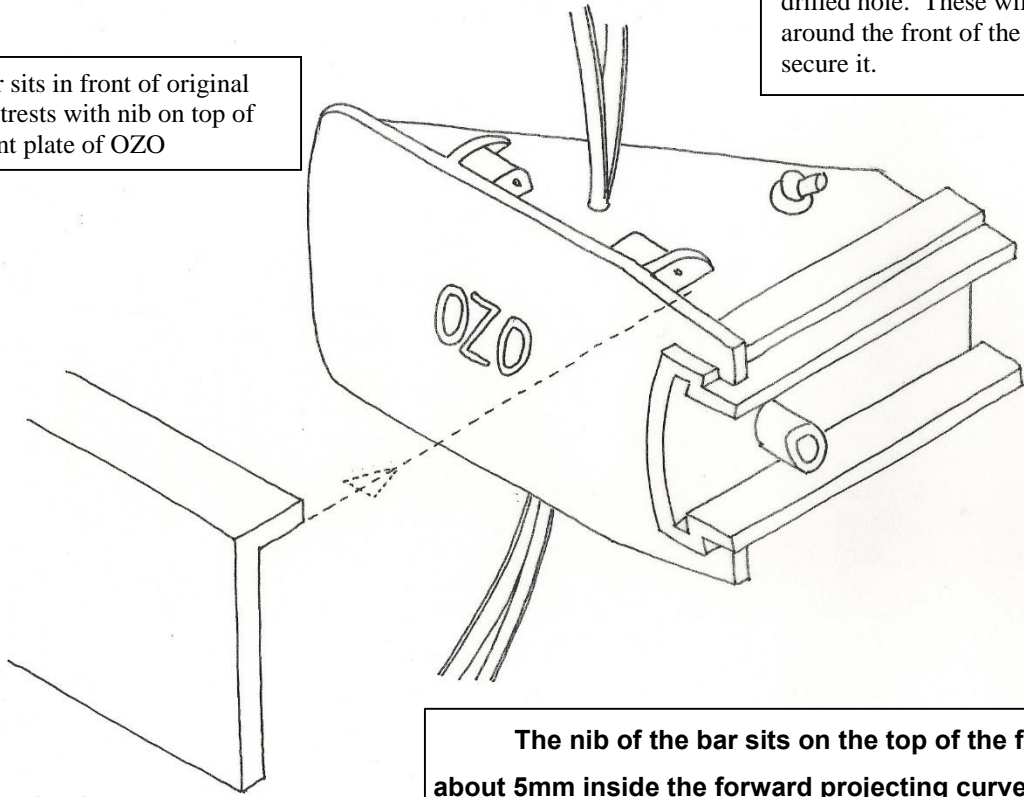


New footrest in place

Changing a footrest will not make you faster if you have poor technique, but with a good paddling style it will increase overall efficiency.

Bar sits in front of original footrests with nib on top of front plate of OZO

2 cable ties threaded through drilled hole. These will pass around the front of the bar to secure it.



The nib of the bar sits on the top of the footrest, about 5mm inside the forward projecting curved rail housing

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