Handrail uprights, RC System and Batteries

This document was written by Paul Naylor and is published here for FMES online viewing, and was written during 2025.

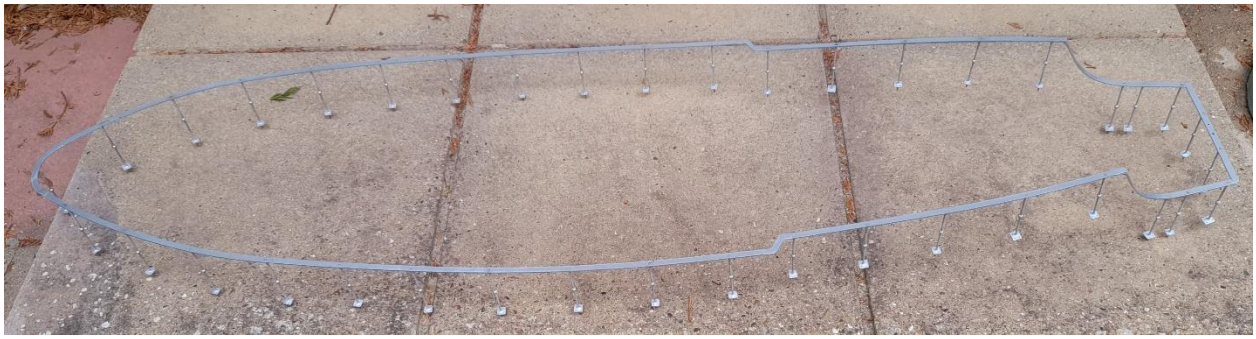
Sundowner – 24

The balls arrived! The first question was how hard are they? A file showed that they were quite soft (I am not sure therefore about their use as bearings with any load) which suited my purpose here. The first task was to drill 2mm holes through the middle of each for the upright. There are essentially two ways to get a hole in the centre of a small sphere: hold it in something central on the lathe and use a stiff drill to make the hole, or make a jig where the sphere fits into a hole with a carefully placed central hole in it to guide a drill. I have to make two holes in each ball: a 2mm one for the upright, and, when the ball is fixed to the upright, another 1mm hole for the wire rope. Fortunately, my lathe is equipped with a set of collets to hold things bang in the centre. This is one of the benefits of buying a second-hand lathe with fittings from an engineer (model or otherwise). The 3/16" collet held the 4.5mm balls I ended up with very well, allowing me to put a centre in each (a stiff drill) and then the 2mm hole. These then fitted snugly onto each upright, and with the aid of a jig, I soft soldered the ball to the middle and the flange to the bottom. A little cleaning up with a needle file and wire brushing (I have a 'spare' bench grinder fitted with a 6" wire brush at one end and a 6" polishing mop at the other: very good for this sort of thing) sorted these out well. I decided not to silver solder partly because of the risk of melting brass, and partly because the uprights are 'half-hard' brass and therefore quite stiff which is good. I think I avoided tempering them with soft solder heat.

The 1mm hole in the middle of each 'ball-with-an-upright-through-it' was achieved more or less satisfactorily using a drill jig to get the hole in the centre. More or less because I ended up making three *steel* jigs as they kept wearing out around the 1mm hole. I wore one drill out (no chance of *me* sharpening a 1mm drill!), snapped another when I missed the hole in the jig and hit the surround, and snapped one in the hole just when it broke through (so tapping it out was easy). This was an attrition rate less than I was expecting and my breathing has now gone back to normal. I used my pillar drill at its high-speed setting for this: although a half inch capacity machine, it is still much easier to use for small holes than anything hand held. The snag is that the chuck only goes down to 1/16" so I have to use a small 'slave' chuck that will go this small in the main chuck. The photo shows one upright, there are 38 more similar in my tray, plus one 4.5mm ball with a 2mm hole that missed the centre when I was experimenting. Just the pin holes in each flange to go.

156 1mm holes later and these are now done: the compound effect of a couple of jigs and some soldering meant that a few of the flanges were not at exactly the right angle compared to the hole in the ball (that is, they do not exactly line up with the wire 'rail') and I did a little 'adjustment' with files resulting in flanges that are not all the same.

Then I etch primed them and painted them with silver-grey paint. The remaining job was to screw them into the holes around the steel handrail without breaking them (remembering the 1mm hole through



each upright!). In the end I had to cut the threads in the uprights a little deeper using the die adjustment, fortunately this was easy to do in my fingers without using a vice etc.

Then I had to fit them to the boat, hoping that there would be not too much distortion that couldn't be corrected with a little 'bending'. When I marked out the position of the holes in the steel rail, I also marked them on the deck for drilling, so it was a case of following these marks with a 3/32" drill (a little larger than the 2mm upright to allow some wobble that would eventually be taken up with epoxy glue), and trying to get them lined up: the bow uprights lean out slightly to match the flare in the sides.

A trial fit seemed to show that it was 'doable' with a little spring in the metalwork to be accommodated – a good job I decided to use brass pins in the flange as this will hold them down while the glue sets. At the time of writing, I am waiting for more of these to come, I don't want to run out half way round as it all has to be done in one go before the glue sets.

While waiting, I carried on thinking about the dark wood handrail top on my steel rail. I had previously ordered some mahogany strip wood and 2mm thick 'plank' from a model supplier 'on spec' for this. These were not expensive and seemed to make sense to use these glued in place on the rail in situ. I started with the curved bits around the joggles near the wheelhouse and the curve at the bow. Two pieces of 2mm thick sheet cut out, one 'blank' for the rail top, and one cut out to suit the shape and then glued together as shown in the photo: all unfinished and one not yet trimmed. I will do the finishing when I have glued these and the straighter bits of the rail to the steel top. Interestingly, the 2mm thick 'plank' is thicker than the 2mm strips (2.34mm vs. 1.93mm) … wood it seems is a lot less exactly cut than metal but then sanding wood is a lot easier than filing metal. The rest of the rails need to wait until I have fixed the steelwork down, otherwise I risk it warping when I try to glue bent bits of strip wood to the metal rail.

Still no pins, so I looked at the rapidly diminishing list of jobs. A few weeks ago, my family bought me a radio control transmitter and receiver (a 'Flyski' 6 channel 2.4GHz job: more than I need but who knows what model comes next?) for my birthday, with an electronic motor controller to suit the set and the motor. This all needs wiring up in the boat, and a servo found for the rudder and fitted. I decided to buy an 'Etronics' standard size servo that is waterproof and has metal gears. They are quite cheap - the reviews I saw seemed fine - and that is now apparently committed to the post. The 'chinglish' instructions for the radio set supplemented by much internet comment have educated me and updated my knowledge of such things. The twin aerials fitted to the receiver are tiny (and with short wires) and the guidelines seem to be fit it so that the aerials are at least above the waterline and 90 degrees 'apart', away from strong current sources (like the motor) and away from metal. Somewhat restrictive then: I decided to make a platform for the receiver and its batteries to fit just under the rear

hatch to maximise the height above water line, and to provide (if required) extension cables to connect it to the servo and motor controller. It means that future boats will have to have their own servos and motor controllers, but the receiver and batteries could be removeable easily. The view through the rear hatch will not be inspiring unless I make a cover, but I expected that anyway. The batteries that I got for the receiver and servo (not the main motor) are AA rechargeable nickel metal hydride type that are 1.2 volts per cell. Apparently, these have low 'self-discharge' (so hold charge for a long time) and do not have the old 'charge memory' that plagued older battery types… and I already had a battery charger for them! The receiver instructions say '5 to 9' volts maximum' so that is 5 cells then. I could not find a battery holder for 5 AA batteries, only 4 and 6, so I got a 6 cell one and cut it down, gluing the bits back together and soldering new wires on it. Two switches, one for the cabin lights and one for the radio, servo and running bits, are mounted on the platform, easily accessible under the rear hatch. The last refinement that might be useful is a battery indicator: I need to research that!

Since it is relevant here, I did the research on a battery indicator: of course, the cheaper ones use current (and flatten a battery over time) to light an indicator, and ones that only switch on and check say every 10 seconds or so are expensive, so a battery indicator is an unwarranted luxury.