

Buoyancy retrofitting

This article is taken from Robin Dickinson's posting on the rec.sport.rowing newsgroup in March 2007 and is reproduced here with the permission of the author. This article should be read alongside Carl's advice. Robin stresses the need for thorough surface preparation and he comments that retrofitting a few boats can be done with hand tools over a weekend. He does not recommend using 'Correx' corrugated board, though.

So - following the RSR debate back in January, we've now completed the buoyancy work on our Carbocraft / Aylings Vllls. Right now, we need to perform leak tests on each compartment and eventually swamped rowing tests (the former will be done later this month when we have time and the latter once weather improves). The following are my thoughts on this process summarised now that we've done it, together with a better estimate of costings.

Bald Facts:

Total cost per VIII: approximately 95 pounds per VIII. Using Sikaflex would be cheaper, as would plywood, and not installing hatches (these are only necessary when the tracks are bolted down within the compartment or if there are existing holes).

Itemised:

8 hatches: just shy of 50 pounds, plus 2.40-worth of stainless screws.

14 bulkheads: 14 pounds for the material (could easily be cheaper) adhesive: just shy of 30 pounds for one pack of Devweld.

Weight addition: ≈1.8kg

Each hatch claims to weigh 112 grams - replacing roughly 50 grams of aluminium honeycomb and fibreglass in the deck cutout. - ≈900g, - 400g = 500g

One pack of Devweld - 400ml @ 1g / ml - ≈400g

14 bulkheads @ <60g per part - approximately ≈900g.

Detailed Facts:

Manpower:

Buoyancy retrofits oscillate wildly in terms of manpower needed, so good planning is essential. For preparation work - get as many people as you can sanding and wiping down the parts of the boat which need to be bonded, as well as sanding the cut bulkhead templates to fit closely. For instance - one person per footwell (two bulkheads). This takes a bit of time to be done well, so the more hands the better. Check over each position carefully after "completion" by the volunteer, as usually they miss a bit.

Conversely, when it comes to the actual bonding process and putting in the deck hatches - 2 or 3 competent people are needed max, otherwise everyone else gets bored standing around.

Preparation:

Before performing any installation work, check around each rib where the existing structure is bonded into the shell, and ensure that the joint between this and the shell is continuously sealed, as well as where the deck is bonded on above. Seal with a neat bead of sikaflex as necessary. Secondly, also ensure that there are no large blobs of existing glue or slide bolts close to these joins, which may impair installation of your new bulkhead piece. Remove slide bolts, and clean solid glue blobs up with a Dremel. When bonding onto a boat with no rib running around the base of the shell (i.e. the aluminium-ribbed Carbocrafts) - I bonded a step of flexible polyurethane onto the skin of the boat so that there was a continuous surface to bond the bulkhead inner face onto flush with the main rib structure - also meaning that there was less risk of a gap between the edge of the bulkhead and the boat skin.

Adhesive:

Many people have mentioned Sikaflex. In our situation, because of the plastic material chosen for the bulkheads, I went for Devcon's two-pack structural adhesive called "Devweld 531". Cost 27 quid plus taxes per 400ml two-pack cylinder; one pack does an entire VIII (14 bulkheads and 8 hatches). You need a double-barrel dispenser gun and mixing nozzle kit, which costs around 50 quid. Both of the above were available online from RS Components (UK). I gunned a bead of this onto each rib around the "lightening" holes, around the edge of the rib / boat skin, and around the edge of the bulkhead insert; then the bulkhead was manoeuvred into position and pressed home until a thin bead of glue squirmed out around the edges; this was then cleaned up using kitchen roll, and left to set. It goes tacky after about 20 minutes, and sets like concrete in 24 hours, even in a cold boathouse.

NB: 531 gives you more work time than Devweld 530, so is easier to work with in this context.

In the case of the 6 inch Holt hatches, a card template was cut out around the deck insert ring. This was used to draw circles into the appropriate position at backstops. Two pairs of holes were drilled through the deck within the ring, and a power jigsaw then used to cut around the circle using a hacksaw blade. These circles of deck were retained for other jobs. A rasp file was then used to adjust the circle so that the ring would fit tightly and flush to the deck. A ring of Devweld was then squeezed around the step on the insert ring and onto the deck around the hole where the insert was going, and the ring was inserted and pressed into position until a thin bead of glue appeared around the edges. This was then wiped around with kitchen roll and left to set.

The small round drain inserts at the corners of each deck area were plugged by bonding 1.8ml Nunc Cryovials which have screw-in caps to each - the diameter is millimetre perfect with a squirt of adhesive. The inserts are also bonded into the honeycomb. The screw caps can then be opened to release pressure and assist draining or ventilating the compartment.

In all, actual installation of bulkheads and hatches took less than 90 minutes total per boat, plus 24 hours until set and ready for inspection and rebuild. Preparation of the bulkheads and boat – 2 days in total (once the process had been thought through)

What would I do differently?

- probably not use Correx - the channels in the material might make it light, but you have to think more carefully about the sealing process. A solid plastic board, plywood, or composite sheet as described by CD and in the earlier discussion would be easier to work with.
- not worry about getting the card templates for the bulkheads quite so accurate in the first place - you do so much sanding when installing that the starting point is less critical.

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