

REPAIRING CLINKER PLYWOOD



When Ullapool's St Ayles skiff was seriously holed last winter, only epoxy could save her. Topher Dawson explains how.

With photographs by Chris Perkins

One early morning last November, *Ulla*, the lovely St Ayles Skiff, which members of the nascent Ullapool Coastal Rowing Club had built so carefully from a Jordan Boats kit – see W79 & W83 – was sucked down the steep slope above the beach, pulling out the boulder she was moored to and battered by an onshore gale coupled with a very high tide. She bashed against some rocks and a concrete drain outlet and was a sorry sight when we recovered her.

I felt sad and guilty, like a bad parent. She was so full of seaweed when we pulled her out, I feared large parts of the gunwale might be missing, but on cleaning her out, we found a hole about 30" by 24" (0.8 x 0.6m) covering three planks under the port stern quarter. There were two long gashes damaging 5 planks amidships in the starboard bilges, with one cracked frame.

The keel and stem were chewed but intact and the

gunwale was fine. So our boat would live to row another day. Since others will probably have to repair glued clinker plywood boats, I will describe the work as I do it.

After cleaning the boat up and stripping out all removable gear, our first job is to put her where she could be worked on. I have found that clinker repairs are best carried out with the boat on her side, with the keel supported by trestles. That way the work is at a comfortable height and well lit from above. Both the inside and the outside of the boat can be accessed without grovelling.

The next task was to decide how far to cut the planks back. It's a decision with some conflicting factors. You don't want to replace more than necessary, which as well as being extra work will disturb the structure. In traditional construction, scarphs have to be separated or staggered so that adjacent planks were not joined close together. This



Above left: The first important stage of the repair is to remove the damaged planks carefully, which is made easier by supporting the hull on its side. **Above right:** With plywood graving pieces epoxied each side, the repaired plywood frame is now stronger than the original.

is necessary because traditional riveted scarphs are not as strong as the planks themselves, so a line of scarphs across several planks would be a weakness.

Ulla is glued clinker and the scarphs are as strong or slightly stronger than the parent planks. So I did not need to worry if my scarphs came close to each other. However it is better that they do not line up exactly because there is always the risk, in a scarph cut on the end of a plank still in the boat, that the new plank will not make a smooth line with the old. If there is a plank above and/or below the scarph it helps to align the joint and the test of success will be that under paint, the joint will be hard to spot.

The hole on the port side is in an area of twist in the planks. My choice of where to make the joints or replace the plank right to the end, was partly influenced by how hard it would be to clamp the joints shut against the twisting force, while the glue set.

MAJOR SURGERY

Having marked the ends of the old planks at 90° across, I took a deep breath and cut them with a jigsaw plunge cut. The part under the lap could be cut with a Japanese saw from outside or inside the boat. The bottom of the cut must only cut the plank above and not the one underneath. In traditional construction it helps to make this end cut at a frame so that the feather edge of the old plank scarph is supported but our boat has so few frames, it was not an option. When the planks were cut back to sound wood, the hole looked much bigger and the broken frame looked weak.

In this boat, the frames are made from two overlapping layers of 3/4" (18mm) ply, with staggered butt joints. In other words the frames are made in the traditional manner out of futtocks – curved pieces – each backing up the butt joints in the other layer. The frame had broken where you would expect, at a place where one layer is butted. I cut both layers

back at a slope of 1: 7, making an X with the saw cuts. The two halves of the frame nearly met like a pair of fangs and then I shaped and glued two pieces of the ply, one each side. The repair is now very hard to see and since it eliminates one of the butt joints, it is stronger than the original.

Traditionally all plank scarphs trail, that is, the vulnerable outer feather edge rakes aft where it is less likely to be damaged by hitting obstacles as the boat travels forward. We have, out of convention, followed this in the original construction of our skiff but with epoxy glue it makes no difference. I could cut the planks back from the outside of the boat which is less cluttered than the inside. For this reason the forward scarphs faced the non-traditional way. Actually this works well with traditional boats too, as long as the timber can be made dry enough to glue reliably.

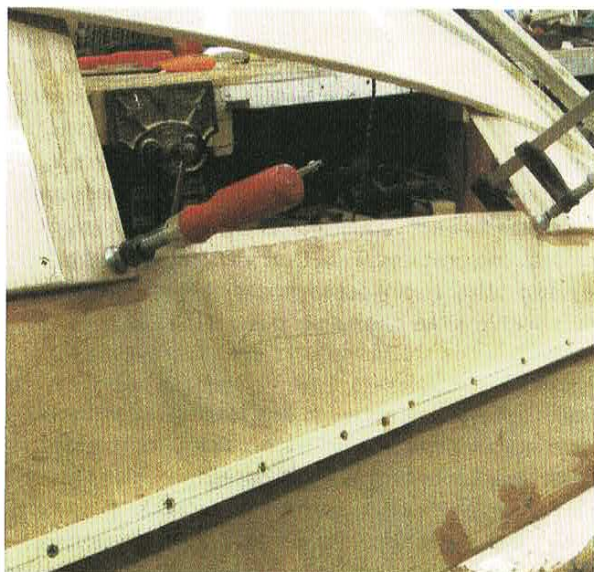
A parallel line was then drawn 60mm away from the cut line to mark the end of the scarph. The ply was feathered back evenly to give a slope of 6.7:1 in the 9 mm ply, the same as the original scarphs. The tool of choice here is a disc grinder with a flexible rubber backing disc carrying a coarse sanding disc. It's dusty but quick and the veneers of the ply give a guide to getting the surface flat and even. The lap space was finished off with a sharp Japanese saw lying on the scarph face and cutting up into the lap. In glued clinker construction, another cut has to be made in the plane of the lap, to cut the lap joint out to the end of the scarph. If done right, a little wedge of ply drops out.

IN WITH THE NEW

Once the boat was prepared to take the new planks, they were made to fit. In traditional construction, the damaged plank can often be kept in a good enough condition to copy its shape but with epoxy-glued laps, the plank has to come out in small pieces. Often the matching plank on the other side of the boat is undamaged and by bending a thin piece



Above: Offering up the new plank. **Below:** Using an angle grinder to shape a new scarph in situ. **Bottom:** The plank in place, faired with a temporary batten until the epoxy has fully cured.



of hardboard or ply on top of it and measuring sideways at intervals, the shape can be taken off. Otherwise the hole will have to be spiled. Cardboard is good for this, with broad tape stuck on the edges to give the exact outline. Of course, you have to add on the lap width to get the final shape. Checking the widths at the ends of the new piece against the scarphs of the hole is good too, in case your boat is not as symmetrical as she should be.

The scarphs on the new pieces can be cut with a plane and sander but using a simple jig with a router produces the most accurate results.

The new planks need to be bevelled with a low angle plane to fit the plank above and the bevel will finish in sharp edges at the scarphed end. Where the taper of the scarph in the new piece meets the bevelled lap, there will be a sloping sharp edge. These are vulnerable and often get bruised when the plank is slid into the gap, because they take the bending and twisting load. In traditional timber planks, there is a tendency for the force to split the plank along the lap line but with our plywood planks this is not a problem. Unlike new building, the plank has to be made to slip under the plank above. The end of the plank goes into a space which tapers off to nothing where the scarph meets the lap between the two old planks. This space is seldom perfectly formed. The epoxy will need to fill any gaps.

I needed to replace the end of the garboard back to the double-ender's sternpost. There are no fastenings to drill out or worry about but there was solid epoxy holding the plank which had to be removed. Though the boat's plank ends are covered with an outer stem added after the planking, I cut a traditional rebate and shaped the plank end to fit into it.

BACK IN SHAPE

In a repair covering more than one plank, there is a little space for some clamps in the first new plank but this soon disappears. There are two ways to hold glue joints shut from outside. One is to apply pressure with a wooden bar clamped or lashed to a clamp at the keel and lashed back to the gunwale, with wedges under it and sheet polythene to stop them sticking. The other is to use temporary fastenings, screws or staples, remove them and fill the holes afterwards. At least two fasteners are needed to stop the gluey plank from sliding into the wrong position. Epoxy can get quite a grip on these, so you need make sure fragments do not stay behind to weep rust. If the screws are reluctant to come out, heat from a soldering iron helps. Force from outside can help or spoil a fair shape so it needs to be applied with care.

Our repair uses both: screws to hold the laps and scarphs shut and force from inside and outside to encourage the planks to curve in the right way. We don't want straight sections of plank with hard corners at the scarphs.

To encourage a flowing curve, we screw down through a batten, pre-drilled with clearance holes every 3" (75mm) or so, into the plank lap. The top plank is also pre-drilled so the screw grips the one beneath and pulls it up to make a tight joint. The batten continues past the repair into undamaged plank, so as to 'splint' the scarph and hold it in a fair line.

It is always an issue holding a scarph joint together while



Top left: Props support the repair from the underside until the adhesive has set, when the temporary screws will be removed.
Top right: Another graving piece is scarphed into the keel.
Left: Making good! The ladies team spent hours building their arm muscles for the new season.

which although sound and strong, did not look as pretty as the rest of the laminated stem so we painted the stem to match the hull. Paint is the boat repairer's friend!

Looking at the repair, I can't say it is invisible, because I know where the joins are but to most people the boat looks like new. Actually better than new because John's new ebony thole pins are the dog's dangles and Chris's varnish and gold leaf look fantastic. So if your boat has a bad moment, don't despair; epoxy is wonderful stuff!

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the glue sets, even when flat on the bench. In a curved and twisting plank, the thin feather edges of a scarp can end up very distorted, since they are much softer in bending than the full thickness part of the plank. It helps a lot to screw a pad over the scarp area to stiffen it up, remembering to cover the pad in parcel tape to stop it sticking to the inevitable squeeze-out. The pad also helps to fair the scarp and the squeeze-out into a fair curving surface.

With an assistant, it is possible to put a plywood pad on the inside as well and screw through the scarp into it from the pad outside. Working alone, I find this is too fiddly and I have to sand the inside lip of the scarp to make it fair.

The closing plank – the last to close a hole – needs the most fitting, as it has to fit the plank above as well as the plank below and the two ends. Since no clamps will fit, it all has to be done with temporary screws along the centreline of the plank lap.

The finished repair will need cleaning up and filling but if the surface of the new is a fair continuation of the old, then it will look just like the original under paint. If the boat is varnished, it will not be invisible but it can look neat.

On our boat the laminated outer stem looked as though a shark had been chewing it. It was bright finished but we decided to go for a solid piece glued in with scarphed ends,

