

# Repairing/Reinforcing Small “Blind” Holes in Fiberglass

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The best way to repair or reinforce a small hole in a fiberglass laminate (like a small puncture or old fastener hole in the deck or hull of a Sunfish sailboat) is to add material to the laminate from behind the hole. Repairing from behind leaves the gelcoat or surface finish immediately adjacent to the hole untouched. The problem is that small punctures or holes are often “blind”—that is, they’re in places where you can’t get to the laminate from behind. I’ve used the technique described here to close off or reinforce holes 3/8” in diameter and larger. With care it can be used on holes even smaller than 3/8” in diameter.

The technique involves building a “backer plate” with a handle that can be rolled up to fit through a small hole. Once on the other side of the hole the backer unrolls and can be manipulated with the handle. The backer can be pre-loaded with dry fiberglass cloth, mat, or other laminate reinforcement material. Once inside the hole the reinforcement can be wet out through the hole, and the new wet patch snugged up against the back of the hole until the patch hardens.

## Materials:

- **nylon mason twine**
- **small diameter semi-rigid tubing**  
(a strong drinking straw will work)
- **“backer plate”**

Two backer plates are pictured. The left is a piece of Ethafoam® (sliced from a larger piece) measuring 2”x2” x 3/16” thick. Ethafoam® is a flexible polyethylene closed cell foam often used to cushion objects in shipping. Polyethylene foam will not dissolve in either polyester or epoxy resin, so either resin type can be used when working with this foam.

The right-hand backer is made of “milk jug plastic” (HDPE). This backer works just like the foam backer, and is perhaps better since it’s stiffer than foam and thus gives more support to the wet reinforcement patch. Unfortunately, HDPE is harder to roll tightly than foam, so it’s more difficult to get an HDPE backer through smaller holes. A foam backer is used in the pictures that follow.

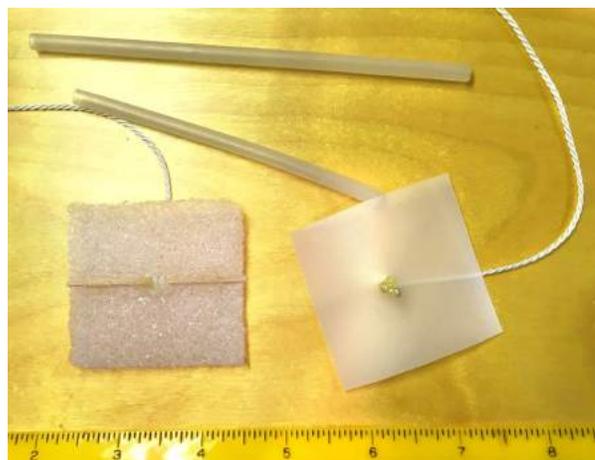


Fig 1

The mason twine is poked through the center of the HDPE backer and tied with a stopper knot hot melt glued to the backer. The foam backer is reinforced with twine tied around a toothpick glued to the back. Use care not to melt the foam with the hot glue.

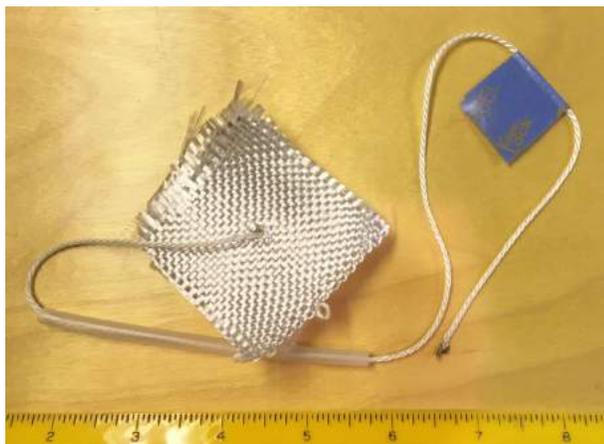


Fig 2

Here the mason twine is fed through three layers of 7.5 oz glass cloth, then through the tubing. The tubing forms the handle for the backer plate. A tab of tape near the end of the mason twine prevents the twine from slipping back through the tubing when the handle and backer are manipulated.

The backer and 2”x2” reinforcement are ready to be rolled tightly together so they can be inserted through a hole in a deck or hull.

Fig 3

With the dry reinforcement layers on top of the foam backer, position the mason twine so it's parallel with the toothpick under the backer. Roll the backer and reinforcement together as tightly as possible, with the mason twine, reinforcement, and toothpick inside the roll.

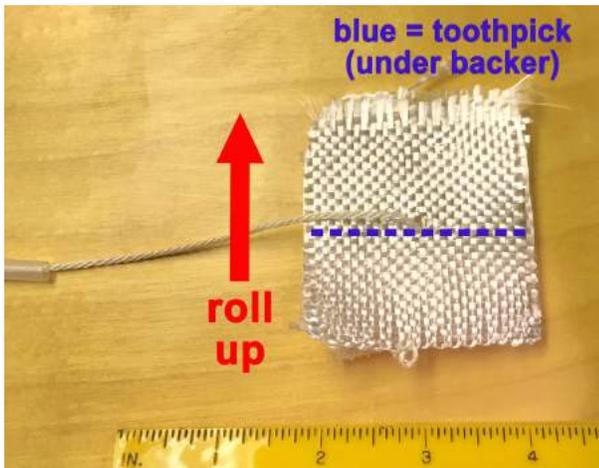


Fig 4

This picture has a metal washer with 3/8" center hole on a larger piece of yellow-green acrylic plastic. The washer + acrylic represents a see-through "deck" or "hull" pierced by a 3/8" hole. Here the 2"x2" reinforcement/backer roll is pushed through the 3/8" hole.

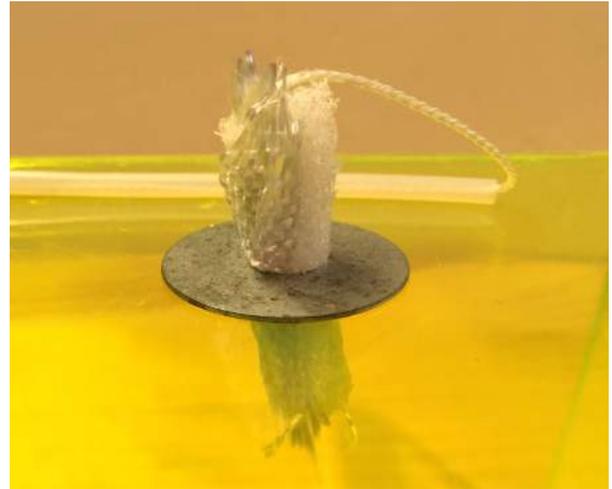


Fig 5

The reinforcement/backer roll has been pushed through the hole in the "deck". The tubing handle slides down the mason twine and holds the reinforcement/backer roll as it opens. A small screwdriver poked through the 3/8" hole helps to open and flatten out the reinforcement/backer roll.

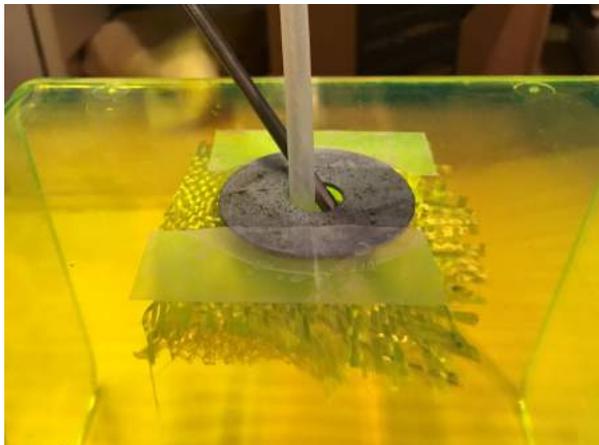


Fig 6

The tubing handle holds the flattened backer away from the laminate so a brush can reach through the hole and saturate the reinforcement with resin. Start with straight catalyzed resin to be sure the reinforcement is completely wet out. You could then add a mayonnaise-consistency mix of resin with microballoons or Cab-O-Sil® and/or a wad of resin and softened mat stuffed through the hole to thicken and stiffen the reinforcement patch. If you do this, don't catalyze too hot!

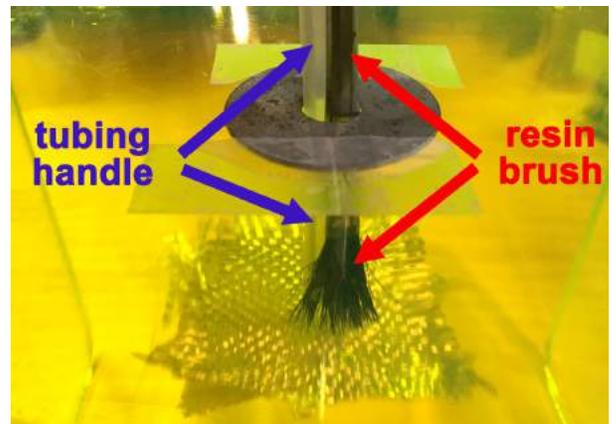


Fig 7

Now the wet reinforcement patch is pulled up tight against the laminate and allowed to cure. (The reinforcement was left dry for the pictures here.)

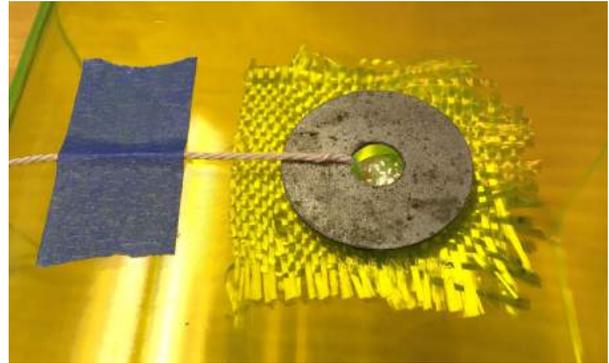


Fig 8

The reinforcement + foam backer from below. The twine-tied-to-toothpick makes a surprisingly strong attachment--you can pull quite firmly on the reinforcement patch.



**Notes:**

Obviously this technique can be modified as required. The limiting factor is the diameter of the hole vs. the diameter of the rolled up reinforcement + backer which must go through it. A thicker foam backer gives more support to the patch but makes the rollup thicker as well. In the example here the polyethylene foam backer was a fat 3/16" thick. It was fairly easy to roll up this backer with three layers of 7.5 oz fiberglass cloth and fit the roll through a 3/8" hole. It might have been possible to use four layers of 7.5 oz cloth, but this would be a very tight fit. (Given a larger hole the amount of reinforcement could be increased and the backer could be thicker.)

- A resin-rich layup of three layers of 7.5 oz cloth is perhaps 0.045" thick; a four layer layup is perhaps 0.06" thick (1/16" is 0.0625"). This is not a very thick reinforcement, but the deck layup of a Sunfish is only about 1/8" (0.125") thick. A resin-based filler can be added before the reinforcement is drawn up (as suggested in Fig 6) and the depth of the hole above the reinforcement will likely be filled with gelcoat and/or some resin and filler concoction.



- An HDPE backer is very strong, but HDPE is stiff and hard to roll tightly. Also, HDPE can be a little difficult to flatten after it's been rolled. Some heat (from a heat gun on low) \*carefully\* directed down the hole at the backer will help it flatten out.

- The reinforcement and backer, of course, don't need to be square in shape. Round or oval is the best match for a round or oval hole. If you are using plain weave fiberglass cloth be aware that round or oval cuts of this cloth with fray very badly--the cloth will "unweave" and fall apart around the edges if manipulated very much.