

Lifting Bolts

Lifting Bolts for Pearson Ensign

By Bill Murphey, #176

Two slings or a travel-lift are the standard methods for moving an Ensign. The boatyard uses their crane to step the mast and you just write another check for services.

However, for the traveling racer, do-it-yourselfer, or people who hate writing checks to boatyards, there is an alternative. Ward Woodruff told me about a method of installing lifting eyes in the keel. He has had them for years. I put them in and they are great. You will need one other ingredient, an old Lightning mast or similar, to create a gin pole to set your Ensign mast.

All metal is stainless steel. Ward recommended $\frac{3}{4}$ " threaded rods. I used $\frac{1}{2}$ " by 12" threaded eyebolts from a local hardware store. Having done some research the $\frac{1}{2}$ " rods are rated at 8000 lbs. each. Your boat weighs 3150 lbs at most.

Materials:

2) $\frac{1}{2}$ " by 12" Threaded Eyebolts

2) $\frac{1}{2}$ " Nuts

10) $\frac{1}{2}$ " by 2" Fender Washers

1) gallon fiberglass (FG) Resin

2) can colloidal FG filler

- 3) 30x36 sheets light FG mat

- 10) ft 3/8 shotpeened chain (5000 lb. rating)

- 1) 15/16" shackle

- 2) locking caribiners

- 12) ft 3/8" braided line

- 1) Interlux Solvent Wash 202 or acetone

Latex gloves, rollers, pan liners, mixing bowls (cool whip), measuring cups (yogurt containers 8oz.), plastic drop cloth for cockpit floor, etc.

Process:

First some welding.

Have a local welder add 2" to the shaft of one of the eyebolts. The welder must ensure that the shaft remains straight and the weld is no thicker than the threads. The bolt will have to fit down a 1/2" hole for its entire length so it must be straight and not more than 1/2" diameter. Also, have him weld the gap in the eye back to the shaft to form a complete ring.

Holes in the boat.

Now go to your Ensign and prepare to drill two holes through the keel. First, scrub the bilge from 4" under the cabin back to the bilge partition and 12" up the sides. Dry this area and then grind the surface clean to provide a

good bonding surface. Grind any remains of the original eye stub (used to lay the keel) down flush. Vacuum the dust and wipe down with Interlux Solvent Wash 202.

To locate the lifting points, measure 8" forward and 8" aft of the original keel eye. Measure the centerline in the bilge. You will need a 1/4" long 1/2" diameter metal bit and a big, two handed, power drill. I borrowed one from an electrician. Drill the two measured spots as vertically as you can. The goal is to come out in the center of the bottom of the keel. You will notice that the drill is fine until the twist of the bit goes into the hole. After this, you will need to use a posthole digger method (drill 1/4", pull out, remove metal from bit, repeat). Go all the way through.

From the bottom, find your holes and use them to guide a 2" diameter hole saw bit up through the fiberglass. You will cut into the cavity between the fiberglass and the lead. Put the bolts in from the top. The longer bolt goes in the forward hole. Test fit the washers to ensure they go all the way up to the lead of the keel. Ensure that the ends of the bolts are about 1/2" inside the finished surface of the fiberglass opening.

In the bilge, ensure that the eyes of the bolts are lined up fore and aft. Lightly tap the bolts down snug. This is to keep the eyes aligned fore and aft and to keep the bolts from pushing up during the next step. If your bolts are loose you should hold them steady in some way.

Now for the messy part.

Down below, mix a batch of resin and filler to the thickness of mayonnaise (ooze but not drip). Put some mix on the first washer. Push it up on the bolt to the bottom of the lead. Repeat four times (5 washers total). Screw nut up as tight as it will go by hand. You do not want to get a socket glued up in there. Cover with remaining mix. The resin between the washers will harden and remove any slack between the nut and the keel. Repeat for second bolt.

Cut two 12" squares of plastic and put duct tape around the edges. Save them for later.

Mix a batch of resin and filler to the thickness of soft clay. Press this mess up into one of the boltholes until it is flush with the bottom of the keel. Try to avoid air pockets. Use one of the plastic pieces to tightly cover the goo and hold it up in the keel. Repeat this step for the second keel hole.

After the resin has set, grind it fair with the keel and apply a second coat if needed. Prime and coat the filled area to match your current bottom coating.

Back to the bilge.

Cut the FG mat sheets as follows:

From sheet 1 cut four pieces 7.5" x 36";

From sheet 2 cut one piece 12" x 36";. This leaves one piece 18" x 36";

From sheet 3 cut one piece 14" x 36";. This leaves one piece 16" x 36";

In the pieces from sheet 2 and 3, cut slits for the eyebolts. To locate the slits draw a centerline down the long length of the mat. Then measure 8" fore and aft of middle of the centerline. Cut a 2" slit at each location.

Now you will mark off the area in the bilge for a fillet along each side of the bottom and for the placement of the FG mat pieces. Using a pencil, mark 10" forward from the front bolt and 10" back from the aft bolt. At these two marks draw a line across the bottom of the bilge. These two lines should be 36" apart. Along the side of the bilge, in the area between the first two lines, draw a line 1" from the hull on the bilge bottom. Then draw a line 1" up from the bottom of the bilge on the hull. Now draw a line 4" up from the bottom of the bilge on the hull.

The 1" lines mark the area for the fillet. The 4" line is to align the 7.5" mat strips along the corners. The larger pieces will cover the bilge bottom and be located by the slits for the bolts.

Mix enough thickened resin for one fillet. Work it into the corner and give it a fair curve into the hull and bilge. The 1" lines will give you a guide for the edge of the curve. If you have more goo then use it. But remember the goal is to provide a smooth, curved surface for the mat to follow so the fillet should be the same size for its entire length. Repeat this process for the other side. Allow the fillet to harden before proceeding.

Resin develops heat as it hardens. I do not recommend that you put more than two layers of mat on at a time. Wait 30 minutes for each batch to harden and the heat to dissipate. Also, you should grind off any strings and lumps from the previous layers so the next layer will lay flat and smooth. Okay, back to work.

The mat strips will be applied using plain resin. Start with the 7.5" strips, resin and a 4" roller. Roll a layer of resin onto the area of the hull and bilge that will be covered by one 7.5" strip from the 4" line down into the bilge. Lay the strip into the corner and pat it into the resin. Use the roller to apply more resin, remove air pockets, and smooth the mat onto the surface. Now apply a strip to the other corner. This allows the first piece time to set. Repeat this process with the third and fourth 7.5" strips.

Now relax for about 30 minutes. You will get better as you go and the pieces will get bigger so pay attention.

Apply the large mat pieces in this order: 12", 14", wait 30 minutes, 16", 18". Each layer will slide over the bolt eyes and cover the layer before it extending up the sides on the hull a little more each time. When you are done there will be only one edge around the project and a smooth surface across the bilge bottom. You can apply additional resin coats to create a glossy surface but there is no structural need for the additional resin.

Congratulations. If you are not a permanent fixture of your boat then you have completed the installation process. Clean up and have a beverage. Let the project harden over night.

Ropes and Chains.

Because the keel is not horizontal, cut the chain into one piece about 4'-10" and the other then being about 5'-2". Put a carabiner on one end of each chain. Shackle the other two ends together. Cut the rope in half. Tie each piece to the shackle with a bowline.

At this point you should step the mast, load your gear, and attach the bow and stern lines. Have faith my little mustard seed.

Attach and lock the longer length of chain to the aft bolt eye. Attach and lock the shorter chain to the forward bolt eye. Place the shackle on the crane hook that is going to lift the boat and take up the slack. Ensure there are no twists in the links of the individual chains and that the chains do not twist around each other.

Lead one rope from the shackle to each jib winch. Wrap it 2-3 times, pull snug and secure it as you would your genoa sheets. Ensure that the chain is still centered in the boat. The rope ensures that the boat does not fall side to side.

When you lift the boat it should stay horizontal in all directions. If the boat does not stay horizontal end to end then remove a link from the low end of the chain and try again. If the boat tilts side to side equalize the tension of the ropes and ensure that the chain is still centered. The boat is not lifted by the ropes.

As with any instruction manual, this is how I did it. It worked for me. I assume and accept no responsibility for your results.