



Place your SS Rods in positions D E F (or 1 2 3 on original photo). Drill 90 degrees to the trailing edge flat spot, about $\frac{1}{2}$ -1" below the spring post, between the post and pivot holes and $\frac{1}{2}$ -1" above the pivot holes. I was doing the repair from my head and forgot about the flat spot on the rear of the rudder (just now looked at mine) so no notches are needed (as when repairing the tip of a wood dagger board), just maybe a wood dowel stained to match to fill the drilled holes. You could also just use the microballoon filler as it is close in color (who is going to be looking anyhow?). ☺ I just thought of something else, degrease the rods before you apply the epoxy. There is a protective coating and/or residue from cutting the threads on the rods.

Keep me posted,

Your plan should make for a rock solid "Fix". A few things you might need to be aware of;

1. Use a standard length "jobbers" drill (3-4") or brad point drill to get the holes started and then deepen the holes, short of daylight, with a 12" bit, clearing the chips frequently. If you carefully cut a notch to get a flat spot at the point you want to start your drill, you can epoxy the piece back in and the fix will be all but invisible.
2. I use 1/4" threaded stainless steel rod, cut about 1/2" shorter than the hole depth, coated with epoxy (105 resin / 205 fast hardener, mix 5:1 per directions) and colloidal silica (406) which is white in color and adds a lot of strength to the epoxy. You could also use microballons (407) which is reddish-brown in color, not as strong, but blends in a bit better than the white on mahogany. The numbers refer to West Systems epoxy products which in my area is a bit easier to get than System 3 or MAS epoxies. Web address – <http://www.westsystem.com/> . West Systems 101-6 Maxi repair pack has all you need for this and other minor repairs.
3. My drill press is not large enough to fit the rudder for drilling so I do it free hand (no jigs) with my cordless drill. After cutting the notch with a fine tooth saw (Xacto razor saw, 54 tpi) and mark the hole on the flat. If using standard jobbers bits, I start with a 1/8" as a pilot and then switch to the 1/4". My brad points are metric, but 6mm is close to 1/4" and with the point I don't need a pilot hole. Before drilling, lay the long bit on the blade along the path it will drill and place a bit of tape on it to mark the maximum depth you want, (it does not look good coming through the other side). I lay the blade flat on my work bench and carefully start drilling keeping the drill bit parallel to the bench and on line with the path desired (keep checking both directions). Once you have reached the desired depth, tape off the blade with some good masking or duct tape in preparation for the next steps. Mix up the epoxy with the colloidal silica (wear gloves), smear it into the threads of the SS Rod and insert it into the hole (cut the rod to length first). Wipe up the squeeze out and epoxy the notch pieces back in place. A bit of sand paper and varnish and you are good to go.

I have been using ¼" stainless steel threaded rod, smooth rod does not leave enough room for epoxy.

1. Tape the area around the holes with a strong, flexible tape like electricians (duct tape has too strong a grip on varnish surfaces, its ok on sanded) and then mask off the rest of the blade to protect it from spills (and put newspaper to catch drips on the table AND floor, you can't be too careful).
2. Cut the rods to length (I have used a hack saw, bolt cutters or a Dremel tool with cut-off wheel, what ever was handy) and degrease (Denatured Alcohol or Acetone are good) them again and let them dry completely.
3. Put on some gloves; mix up enough epoxy (with #406 colloidal silica if you are using West Systems products) to mayonnaise consistency. Coat the rods, working the epoxy mix well into the threads with a throw away brush (called acid brushes – tin handle with about ½" long brush). Dribble just a little epoxy (a drop or 2) into the hole to get started and slide the rod in and don't worry about what is scraped off, just catch the drips. There will be enough epoxy left captured in the threads to bond the rods to the wood. Too much epoxy into a blind hole (one that stops before going all the way through) may cause a "hydraulic" lock (for lack of a better word) by trapping excess epoxy that will prevent the rod from seating all the way in. If in doubt, drill the hole through (put a piece of tape over the far end, that will be the "escape valve" if things start to fill up) and later plug (hide) both ends like you plan with the mahogany paste.
4. I normally clamp the blade in a vise so that the rods are vertical and fill the opening flush (after the rods have been placed in the holes). Some times the epoxy will sink into the hole (meaning the epoxy has flowed down the threads and filled any extra space or leaked out the other end, you did put tape over the bottom hole) and sometimes it won't (the hole is a good fit). Just keep an eye on it until the epoxy starts setting up.
5. The mahogany/epoxy paste mix will look very dark compared to unstained, unvarnished wood. Not to worry. Once the blade is sanded, stained and varnished it will almost disappear.

If you haven't bought your epoxy yet, I would suggest West Systems large repair pack (101-6 Maxi). It has six packets of resin/hardener, colloidal silica (white), micro-balloons (red/brown), gloves, mixing stuff, etc. Use one packet with filler per rod (or 2 if you are quick) and you should be good to go and have some stuff (in the kit) left over for repairs later. The last pack I bought was about \$27 (I think, it's been a while). The West Systems web site is <http://www.westsystem.com/>.

Good Luck

Do your drilling in this order; (1) 1/8" short to center the (2) 1/4" short which will provide a guide for the (3) 1/4" long. Your lay out on tape looks good, 3/4" space is good as well as centered between the spring and pivot holes (kind of keeps the stresses even in my book). I would also stop the rod at or before the blade starts to taper at the edge (1-1/4"), about what you show on the masking tape. Practice on scrap is as good idea if you haven't done this before. Try a piece of 1 x 6 to start and go all the way through taking your time (go slow) to check the horizontal and vertical planes frequently. Hopefully you will come out the other side in the center of the board, it can be a little tricky. Do it a number of times until you feel confident in the scrap wood (pine, spruce, cedar), when you go to the mahogany, being harder, will help keep the bits straight, which means the start holes need to be accurate. I usually drill on the slow rpm setting, pulling the bit out frequently to clear the chips. If I think/feel I am starting to drift off line, I switch to the fast rpm setting, check my alignment and reduce my feed rate (go slower) into the stock. This will allow the bit to scrape the side a little to correct for any drift.

Good Luck and keep me posted.