



Repairing Copper Foil Projects

Stained Glass 101

by Brian McMillan



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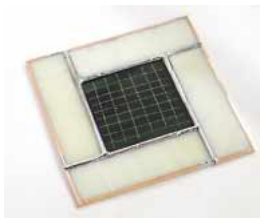
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It Happens To All Of Us

Everyone who works in stained glass will, sooner or later, have to replace a piece of broken glass. The most common cause of breakage is because the glass cracked during soldering. This is referred to as a heat crack. My theory is that the glass had a weak spot, flux was forced into it, it expanded and then the glass cracked. If I was heated up to 700°, I might crack, too. When I first started working with stained glass 26 years ago, it was common to use the ball on the end of your glass cutter to tap underneath your score to run the score and part the glass. I always had at least one piece of glass heat crack in every piece I made. Once I stopped tapping, the heat cracks became much less frequent.

So, removing cracked glass is something I am very familiar with. In most cases, there is no value in saving the glass piece. Use a dull glass cutter (I put an old head in my carbide cutter) to make scores every 1/4" vertically across the cracked piece. Do the same in a horizontal manner, creating a checkerboard effect on the glass. Now **this** is where you can put the tapping ball on your glass cutter to use. All straight barreled glass cutters have a ball on the end which is suited for this purpose. If you have a Thomas Grip or a pistol grip, you can buy a cheap steel wheeled cutter to have on hand just for this purpose.

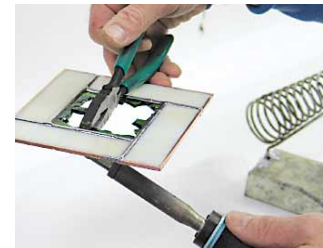


Start tapping underneath the glass with a firm, fast tempo. You must keep the glass from bouncing around or you will be tapping all day. With a small project—a suncatcher, vase, lamp etc.—this is achieved by balancing the piece on the edge of your work table. If you place a garbage can below, it will catch most of the mess. With a larger window, you must lay it flat on your work table and then adjust it so that the cracked piece is over the edge of the table and once again over a garbage can. **It is imperative that you wear safety glasses**, as when you start tapping there will be glass chips flying everywhere. Tap until all of the scores have run. Continue to tap vigorously in the center of the piece until glass squares begin to pop out. Once there is an opening, you will find that as you continue to tap most of the squares should fall out, until all that is left is the glass around the edges, which are held in by the copper foil.

If the glass piece you are replacing is larger than 2"x2", you will be able to use a pair of grozing pliers or needle nose pliers to work some of the edge pieces out. Wiggle the glass gently up and down until you can pull it out without pulling the foil away from the joining glass.

It is now time to plug in your soldering iron as you will use it to loosen any remaining glass pieces. Place your iron directly on the copper foil seam, underneath the glass piece. The majority of the solder will melt through. Grasp the glass piece with your grozing pliers or a pair of

needle nose pliers. Gently wiggle it side to side and up and down. Since most of solder is gone at this point, the glass should come out quite easily. If not, place the iron



back in the previous spot on the solder seam beneath the glass piece and hold it there while wiggling the glass. If it sounds like you could use three hands to do all this, you are absolutely right. However, I usually manage quite nicely on my own.

Now that all the glass is out, you can work on the copper foil. Apply the soldering iron to the underside of the solder seam. Wait until the solder at this location is completely melted. You will be able to tell when you reach this point because the melted solder will be shinier than the cold solder. Gently—and I mean **gently**—grasp the foil with a pair of pliers and pull it away from the seam. **Do not** pull too hard or you will pull the foil off the neighboring pieces, which will just add to the pain. Move your iron over 1/2" and, after the solder has melted, pull the foil away. Continue this all around the piece to remove the foil. Remove any remaining solder by applying flux and drawing the iron along the bottom of the panel until the solder melts and drops off into your garbage can. Flick it off your iron every once in a while as it builds up.



What If You Need To Save The Piece?

Sometimes, you may want to replace a piece of glass without breaking it as discussed above. This may happen because you soldered a square piece in with the texture facing the wrong way or with the streaks going in the wrong direction. Here's my \$2 trick to remove it. First, I cut a 1"x6" long strip off an aluminum soft drink can with one edge tapered to a point... remember that solder doesn't stick to aluminum. I hold my iron underneath the project, on the solder seam of the piece I wish to remove. After about the count of 10, most of the solder will drop through and I can wiggle the tapered corner of the aluminum up through the solder seam. Once it is through, move the iron 1/2" ahead of the aluminum and move the aluminum once the solder is completely melted. If you time it right, the solder on both sides of the aluminum will harden, leaving a space between the glass pieces. Eventually you will make your way all around the piece and the glass will drop out in one piece.

Hopefully, these tips will make replacing glass pieces less frustrating for you.

Happy crafting,