

Tips for Tips

The following is a process by which to make your wing tips stronger and ease the installation process. As always, I start with the caveat that this is not the “only” way but the way that I’m using on my new plane. This knowledge was gained through experience with my first 7 and while helping several others with their glass work.

A bit of history first. My flying 7 has the older style “Bat” tips. I really like the styling of these compared to the straight trailing edge on the new version. They give some character to the tips. I have two antennas in one tip and one in the other. I did nothing else inside despite my feeling that the glass was flexible in some areas. This problem bore itself later when I flew to a fly-in and a tip was damaged.

I had flown to a popular SoCal fly-in and was directed to a parking area that was pretty tight. I was advised to cut my engine. Before I could open the canopy, two well intentioned staff members grabbed the plane by the tips to move into its final parking location. In that process the tip was squeezed. The result was a cracked tip which damaged the paint job. I did some repair to the inside but have not had the tip repainted.

So.... on the new plane, and those I help, the inside of the tip will be reinforced using a light weight process that provides additional stiffness to avoid the above. Additionally, I have noticed the tips compress at high speed. Hopefully this will help keep the tips in the intended shape and therefore no unnatural air disruption.

Materials List

West Systems epoxy and slow hardener. One quart should do all of the glass work on your RV. I have the fast hardener as well and could come in handy for you.

Medium thickness Super glue. (aka CA) Purchase from a hobby shop. Also purchase the accelerator. If in doubt, ask. The accelerator will be explained later.

Metered pumps for the West Systems.

8- 48” x 1/4” dowels. (Lowe's, Home Depot)

West Systems 410 micro filler

3” wide fiberglass tape. (www.cstsales.com)

mixing cups

Popsicle sticks box of 1000 (Michaels, Joannes etc..)

Denatured alcohol

1" wide brushes. Get the cheap ones from Home Depot or Lowes, lots of them.

Rotary cutter and cutting mat. (Michaels, Joanne's, cstsales)

Here we go!!!!

First, as with all glass work, clean thoroughly before marking or sanding. Depending on the process, there could be residual release agent on the glass that could cause problems later. You'll never go wrong cleaning any glass before beginning work. I clean with soap and water first and a stiff brush. After this is done I give a good wipe down with acetone then rinse off again with water.

Since we are going to be working on the inside of the tip your access is going to be somewhat limited. However, the area we will be dealing with is fairly accessible and needs to be cleaned with the process above.

You can see from the photos the area where the reinforcement strips were added. I determined the location from pressing on the skins while tips were clecoed to the wing. I marked areas where the glass was easily manipulated.

The tip was removed and the marks translated to the inside. My intent was to use 1/4" dowels epoxied to the inside of the tips at the desired location and then a strip of glass cloth laminated over the dowel.

On a friends tips, we reinforced using several strips of glass cloth. This was effective but added considerably more weight than the dowel method. This caused me to seek an alternative to just using glass.

Make a line inside the tips where the dowels will go with a Sharpie marker. With a Dremel tool with the sanding drum attachment begin roughing an area 2" on each side of your line. I really like the cordless Dremel with the Lithium batteries. It makes the work easier with the cord out of the picture. Wear a long sleeved T-shirt to avoid fiberglass discomfort. Also, use your shop vac with your free hand. When completed, vacuum thoroughly and wipe down the area with acetone, denatured alcohol or lacquer thinner.

Prep the end of the dowel as indicated with a belt sander, Dremel or sanding block. You don't have to but it looks neater when done. You can leave the end as is and not take the cloth all the way to the end. Same results, just not as purdy:))

Now we have to attach the dowel to the tip. There is no way to clamp it easily, so use the following method. We will use the instant glue described above (CA) and the

accelerator for this purpose. It is important that we maintain the natural form of the tip while doing this. Be careful if working on table because it will “flatten” the tip where it is pressed against the table.

Holding the dowel in place on the line, put a couple of drops of CA at the end and let it flow. Keep in mind, we are only trying to secure the dowel for the next step. Do not use the CA the entire length. Once the CA has flowed, spray the accelerator on the joint. Hold in place for a minute. After a couple of times you’ll get the feel for how long it takes for the glue to “kick.” I shouldn’t have to, but I’ll give you the warning not get any glue on your skin in the process. Not only will you become part of your wing tip, but the chemical reaction of the CA and accelerator creates heat.

Repeat the process about every 6” until the dowel is secured. Again, **do not** use the CA the entire length of the dowel. Do the second dowel with the same process. I do one surface at a time, (top or bottom) then move on to the next.

Mark your West Systems metered pumps for half travel **before** you put them in. No need to waste epoxy by using a full pump when a half will do.

In a small mixing cup, (I use the 2 ounce plastic cups from Costco), pump a half pump of epoxy and hardener. Add a little of the 410 micro filler and stir. Continue to add and mix until you get a thick mix that will not flow to level. About peanut butter consistency works for me.

Working slowly, place the epoxy micro mix along the dowel and tip surface. Don’t use too much. Use a popsicle stick to form a fillet between the skin and the dowel. Continue on each side of the dowel. Recover extra mix as you go to make the job neater. The outer dowel, outer edge, you’ll be working in the blind but it is doable. When you have one side done, use some alcohol on your finger and smooth the fillet. You’ll get this hang of this in no time. When cured, knock off any high points on the dowel with sand paper.

If you’ve chosen to taper the ends of the dowel, use the epoxy and filler to smoothly blend the tip to the skin. Use alcohol to assist in the process. The index finger works great for this.

Repeat the process for all of the dowels you have determined you might need. If you intend to use the Archer antenna that lays in the bottom of one of the tips, attach it first before doing the dowels. I have included pictures to demonstrate how to adapt the dowels in this situation.

If you purchased the 3” wide tape from CST, you are ready to go. If not you’ll have to cut strips. I highly recommend the tape. Using cut strips in the confined area will have you making up new words. If you tapered the dowels, cut the glass about 2” past each end. If you didn’t cut the strips 1/2” short of each end. The reason I’m doing this is to make it easier, so follow my lead. Work smarter not harder!!!

Mix one full pump of epoxy and hardener. Mix thoroughly. Brush the epoxy onto the skin and dowel. Go about 2" on each side of center. Don't use too much, just enough to wet the skin and dowel.

Lay the appropriate strip of glass on the dowel. Do your best to center on the dowel and end to end. Before putting the strip inside, you can fold it length wise. This will center it on the dowel. Using the brush, begin brushing epoxy on the cloth. Start on the top of the dowel. As you wet the cloth, the cloth will begin to conform. Continue until the cloth is down and conforming nicely. Only use enough epoxy to wet the cloth. Repeat with the other strip. One ounce of epoxy should do both strips. If not mix a half pump to complete the job.

Do your best to get any "hairs" of fiberglass to lay down. When everything is cured, you can go back in with your Dremel and sanding drum and take off any edges or hairs that you want to remove that didn't cooperate.

As you can see, the tips are significantly stiffer now. Hopefully safe from squeeze damage. Although I did not weigh everything I estimated that 12 ounces per tip was added. Well worth the effort. You can estimate 6-8 hours of work to complete. Please feel free to contact me with any questions.