

Lancair Legacy
Lancair Legacy
Supplement
Supplement

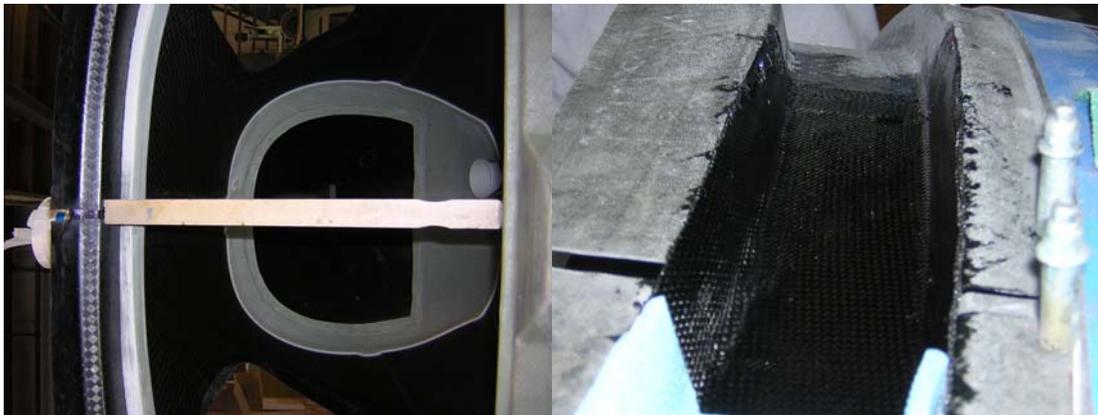
Written by: Sean Cole
September 19, 2008



When fitting the stiffener use 3/32" clecos to hold it in place, it makes a smaller hole and is easier to work with. Only use the amount needed to hold the stiffener from moving as you work, it is unnecessary to put them every 2-3 inch's in this stage.



Before fitting the stiffener you need to place 1/8-inch shims around the top of the door seal joggle approximately every 12-14-inch's. You want the stiffener to rest on the shims as best as possible. The stiffener may bind on some of the shim's (**this is not a problem**) just remove the shim and keep fitting the stiffener the best you can, it will not be perfect.



After fitting the stiffener you will need to put a 6 BID, that steps from 14"-12"-10" in length and is as wide as the channel in the stiffener. You may need to put a stick under the stiffener to make the two sides flush. At the top of the fuselage, you should put clecos through the stiffener to hold it against the shims on the fuselage.



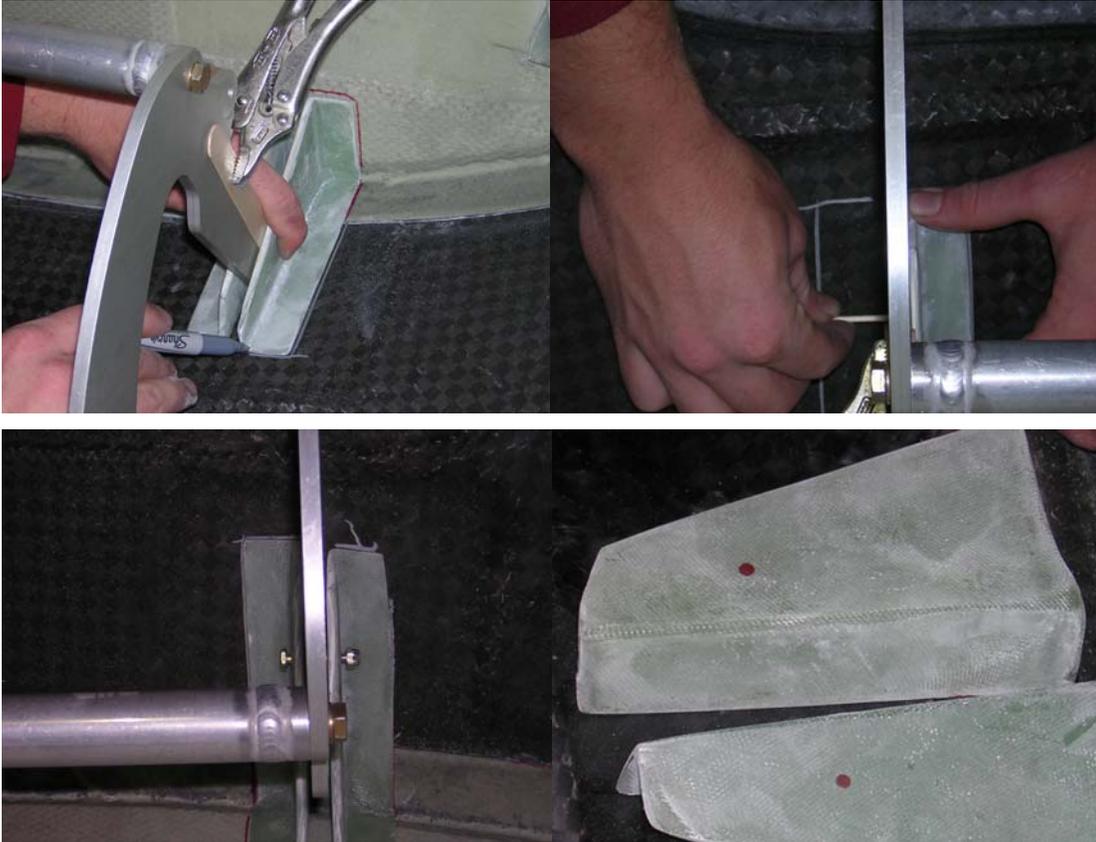
When you are aligning the canopy hinge you need to make sure that you have your 1/8" spacer underneath the hinge. You will need to do some grinding on the spacer so that it will sit flush on the canopy stiffener. To align the hinges with each other, bolt the canopy hinge support to the hinges. To align the hinge with the firewall use a 6" scale and measure off the core to a stationary point around the bearing on the hinge, you will need an even measurement on both sides of the hinge to make it

square. You will not need the canopy hinge support after the canopy is complete because it will interfere with your avionics. There are two ways that you can install the nut plates for the canopy hinge, you can either pop rivet the nut plates to the stiffener or you can bond them on like in the picture above by squeeze riveting the nut plates to a piece of fiberglass/carbon fiber that is at least 5ply's thick.



When trimming the flange that your windshield bonds to it helps to trace over it with a visible marker. **Don't trim exactly on the line!** You may end up taking a bit too much off. The best thing to do is cut just above the line so that you can still see it. When fine adjusting the flange it is best to do it by hand with a 6" 3M sanding block with fresh 40grit sand paper. In the tight corner of the stiffener it is good to use a round perma-grit file. To get the flange even all around the stiffener use

your 6" scale and measure the inside of the flange around the stiffener.



After the canopy hinge is square with the firewall and the nut plates are installed you can set up the hinge mounts. Start by clamping a 1/16" tongue depressor to either side of one hinge. Set the canopy brackets up against the tongue depressors on the hinge and outline the bracket, after doing that you can take the tongue depressors off the hinge. Take a Q-tip and ink the tip, then take one of your brackets and line it up with the lines you drew.

Push the Q-tip through the hinge bearing, keeping it as straight as you can, and mark a dot on the bracket for drilling. After drilling your 5/16" hole, install the hinge bushings. Repeat for all brackets.

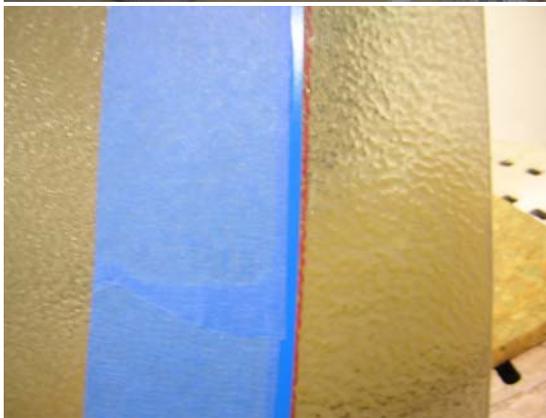




To start fitting the canopy stiffener, line the fuselage (just below the canopy joggle) with 2" painters tape. Use your compass to draw a line on the tape. Use electrical tape or pin striping tape to trace the line that you drew, this tape will work as a guide for your compass to transfer the location of the joggle onto the stiffener so that you can make your first cut. After you set your stiffener down onto the fuselage and draw a trim line all around it, go ahead and trim your line but do not cut exactly on the line. It is best to cut about 1/16"-1/8" away from it to be sure that you do not take too much material off. This process is going to take a few hours, but it works well. After making your rough cut, use a palm sander with 40grit sand paper to fit the stiffener down into the joggle. Start sanding around the front working the left and right front corners until they both rest inside the joggle and on the shim's; don't just do one side at time. Make sure that you take your time to get the stiffener to set on the shims that you placed earlier. (Don't forget that you can remove any that are putting force on the stiffener) after you are happy with the way the front is sitting in the joggle you can place 2 clecos in the very front to hold the stiffener in place as you work your way towards the back.



The best time to put in your canopy alignment pins and the latch striker plates would be after the hinge is installed and before you bond the skin on. You may even like to do it before you bond the windshield on so that you don't have that extra weight.



After you have trimmed and set your windshield-bonding flange you can set the glass down on the stiffener. Move the glass around until it sits well on the stiffener. After you find the placement that you like then take a sharpie or some sort of writing utensil to mark a line on the windshield, after marking a line all around the inside of the glass pull it off and set it on a table that you are comfortable working on. Set the windshield right side

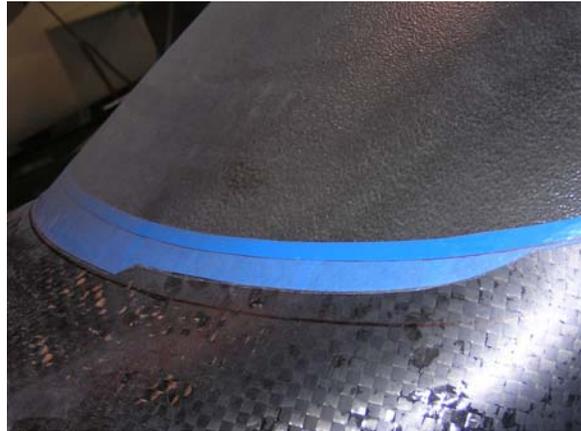
up on the table, you should be able to see your line through the protective laminate. On the outside of the windshield peel the laminate back about 1/4" past the line that you drew on the inside. After doing this, take your 1/4" pin stripping tape and place the lower edge of the tape at the top of the line looking through the canopy, this will give you about a 1/8" gap between the tape and bonding flange. (To help keep the tape from being bonded with the glass) when you have laid out your 1/4" tape, take your 2" painters tape and overlap about half of the pin stripping tape all around the windshield. (This will give you a surface to draw a line on for fitting the skin in the future) after you have laid out all your tape on the outside of the windshield, roll it over and peel the laminate back on the inside past the existing line. You can repeat the same process as you did on the outside, or you can use 1/2" tape to line the inside of windshield; lay the tape even with the tape on the outside by looking through the glass. Now that all of the tape is laid out you can take your compass and set it to the width of your bonding flange and use it to mark a trim line (Yes you have to trim the glass) all around the edge using the tape as your guide, it is really easy to cut the glass with a roto-zip just be careful to make sure that the tool doesn't jump around because it will fracture the glass. When you are satisfied with your cut job use a palm sander with 80-grit sandpaper to clean up the edges and also prep the exposed area for bonding. Once you are satisfied, and both bond areas are prepped you can bond the windshield.



Bonding the windshield is a pretty easy job; it takes at least 2 people to do this. When bonding you will need about 250grams of hysol, some homemade clamps (like shown in the picture) machine screws, area washers and wing nuts. Use the hardware for securing the clamp to the side of the glass using only enough pressure to get good squeeze out. You will be surprised about how little pressure it takes, if you over tighten the clamp you will end up with a big gap between the flange and the glass. Use only the amount needed to hold the glass against the flange, usually 2 is enough; sometimes it may take 3 per side. Use weight bags to hold down the front and rear portion of the glass instead of using clamps, it makes it easier.



When you start fitting the canopy skin it is usually best to cut it into 4 pieces. Start with the front piece by trimming some of the extra material off, center the front skin the best you can on the stiffener. Use your compass to draw a cut line on the front of the skin that will rest directly on the stiffener. Cut close to the line, don't cut on it, you will want to use your palm sander to make it fit so that you don't take too much off. Don't try to fit the whole thing at once; you will need to fit the skin around the tapeline on the glass as you work the leading edge of the skin. When you do start fitting the skin to the glass make sure to take your time, slowly work your way down around the sides of the canopy from the center of the skin, working back and forth between each side. Don't work one side more than the other. **(You will end up with a lopsided skin)** as you get the skin to fit you can place a cleco through the skin into the fuselage, this will keep the skin from moving too much and as long as you press the skin against the glass when you drill your cleco hole the skin should sit nice on the glass. After you are done with the front skin you can put in your stiffening ribs in the front of the stiffener.





When fitting the rear portion of the skin you need to make sure that it is centered on the canopy relative to the front portion. To do this, place the rear portion of the skin on the back of the canopy, hold up the side corner pieces that will have and check both sides to ensure that there will not be a huge gap when you get around to fitting the side corner pieces. Draw a line on the canopy to use as a reference as you fit the rear portion of the skin. Use your compass again to draw a trim line, but don't trim on

the line, sand to it. This will help keep you from taking too much off. Start fitting from the top center and work your way down each side, placing clecos as you have the skin fitted between the tapeline on the glass and the canopy joggle. (You should be a pro at this by now)

Fitting the side corner pieces is very easy. Hold the piece up where it wants to fit best between the rear and forward portion's and use your compass to draw a trim line for the canopy joggle. After you get that portion fitted into the joggle trim some excess off to start fitting to the tapeline on the glass. Go ahead and place one cleco to at the very top of the skin, it will serve as a pivot point as you get the skin to fit tight to the glass. As you work your way down

around you can add more clecos as necessary, if done right you can get away with not having to use any clamps when you bond the skin on.





Now the fun part begins, bonding the skins! When bonding the skins on you are going to want some clamps like shown in the pick, it's just 1/2" ply would, one piece is 3"x4" and you glue the other piece that is 1"x4" to it. Use the clamps to hold the sides of the front skin to the glass and you can use weight bags to hold down the front portion of the skin. If your clamp isn't pressing the skin tight enough for your liking to the glass you can place something like a stir stick or paint stick in between

the clamp and the skin to put pressure where you need it. There may be up to a 1/8" gap between the skin and the glass, depending on how well you fit the skin. Get it the best you can and you will just have to do body work later.



When bonding the side corner piece you may have to use to long vise grip clamps and a paint stick to hold it to the glass, depending on how well you fit the skin. You will know if you did a great job fitting the skin if you don't have to use any clamps when bond this piece on. The way you will be able to tell if you do need a clamp is 1) you had a gap when you dry fit the skin, or 2) you press on the skin over the glass after your hysol is on and the skin raises back off the glass.