Eric Tingey
226 Gary Ave LaSalle
Ontario, Canada
N9J 1V2
(519) 997-4161
etingey1@hotmail.com

additional editing by Dino Bortolin
dbortol@yahoo.ca

Canopy Fitting for the Zenith CH 601 Series Aircraft

A Methodology developed to eliminate the commonly used trial and error process.

Canopy Fitting for the Zenith CH 601 Series Aircraft

Objective:

Develop a process by which the canopy can be cut to fit with a degree of accuracy the first time.

Method:

1. Level the longerons in the cabin area in the X - Y axes
2. Build a support for the canopy
3. Place the canopy in position, over the fuselage
4. Fabricate a Layout Tool
5. Mark out the fuselage profile
6. Cut the canopy to the profile line
7. Confirm the fit

Process:

1. Level the longerons in the cabin area in the X – Y plane.

    1.1. A Smart Digital Level was used to level the longerons along the sides of the cockpit in both axes as a reference point.

2. Build a support for the canopy

    2.1. A support was fabricated from 2 inch Styrofoam. Its light weight and rigidity lends itself to the application, and is easy to work with. The height of the support was 15", however this dimension is not critical; the layout tool will be made to match.

    2.2. The Styrofoam was cut on a band saw to ensure a square surface, for assembly, and the application of glue.

    2.3. Glue was applied to the mating surfaces of the canopy support. The support assembly was gently held in place with 4" wood screws while the adhesive set. (Note: gently tighten the screws, just enough to hold in place)

    2.4. A pair of 2x4's was placed on top of the canopy support to accommodate the width of the canopy. Make sure that the top surface of the 2x4's is level in the XY plane.

3. Place the canopy in position, over the fuselage

    3.1. Place the canopy over the fuselage, directly above the desired location, as if it were to drop down into place. See attached photo. Secure the canopy in position with a C-clamp or equivalent.

4. Fabricate a lay Out Tool

    4.1. Fabricate the layout tool from a piece of lightweight rod. In this case we used two pieces of 1/8 Aluminum Welding Rod.

    4.2. The Lay out tool is fabricated from two such pieces of rod, with a double length of tread between them, forming a simple plumb bob.

Figure 1: Sharpened end

    4.3. The first rod is sharpened to a near point on one end (Figure 1). The other end was drilled with a small drill, as close to center as is possible. This was accomplished by clamping the rod vertically and using a small drill press. The same end of the rod was cross-drilled to intersect the first hole. This was used to run the doubled thread into the rod and one end out each side of the cross-drilled hole (Figure 2). A substitute method would entail the use of "Crazy Glue" to the end of the rod, to anchor the thread.

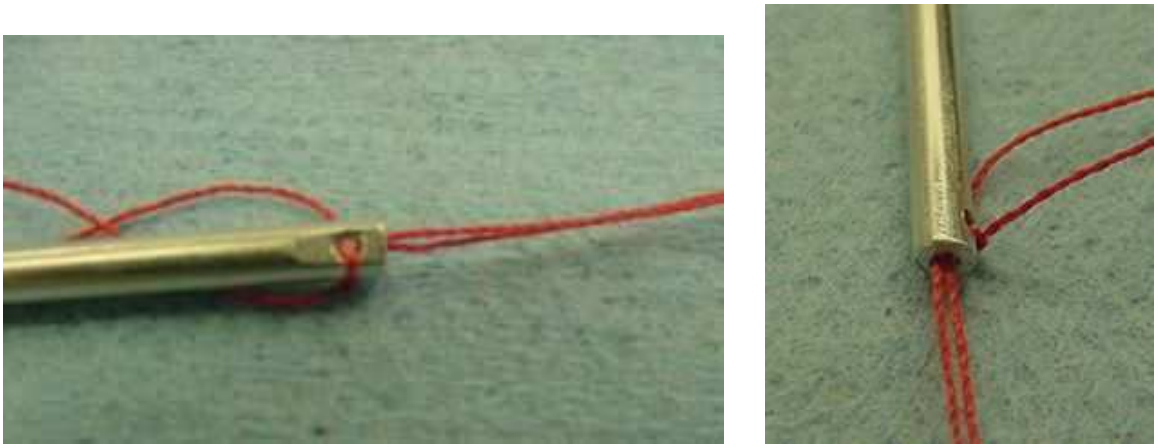
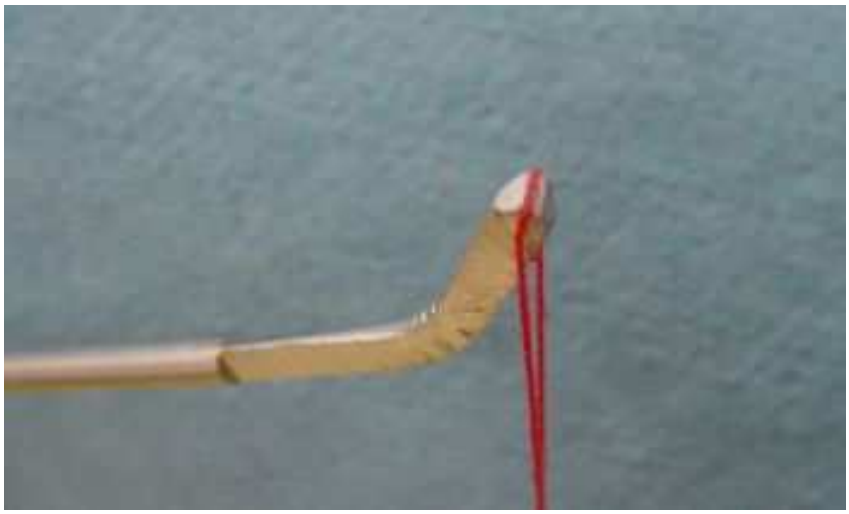


Figure 2: Drilled end

4.4. The second rod acts as a handle and is of a longer length, about 12 inches. The last ½ inch on one end is bent at approximately 45 degrees. The bent end is further filed down in width except at the tip to provide clearance for the thread to hang without interference. The thread is held in place with a drop of "Crazy Glue".



4.5. Measure the distance for the canopy to drop straight down. This will be the distance that you want to set the layout tool to. In my case, I measured from the canopy sitting on the support to the top longeron, less the gap for the canopy side frame when finished and sitting in place. In my case the canopy was 15 inches above the longeron and I wanted a 3-inch gap when finished, therefore my final layout tool length was 12 inches. 12 inches was marked out on the table, and the first rod with the formed end was clamped in place. The second rod was clamped in place, and the thread secured, so that the length from tip to tip was 12 inches.

Figure 3: Assembly of layout tool

5. Mark out the Fuselage profile

5.1. Using the lay out tool, reach under the canopy with the tip of the handle gently resting against the canopy and slide into a position until the sharpened end of the plumb bob just contacts the fuselage. Mark the exterior of the canopy with a suitable marker (Sharpie) directly above the point where the tip of the handle touches the canopy. Continue the process until the profile is completed for both the fore and aft sections. I marked about every 2 inches to begin with and went back a second and third time to fill the marks in between until I had a pattern of marks about ½ inch apart. Reason being that if a mark looked out of place I would re-check the layout tool position.

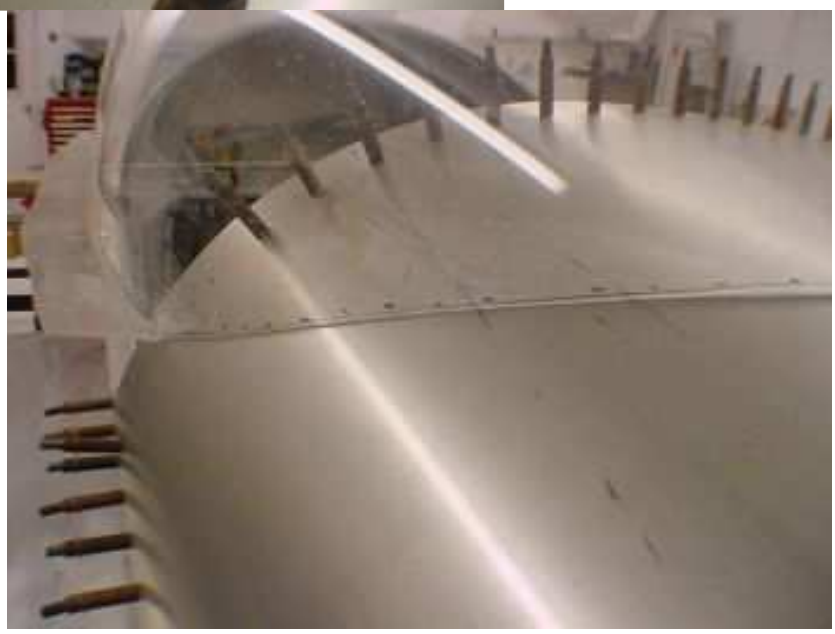
6. Cut the Canopy to the profile line

    6.1. Stretch a piece of rubber along the row of marks on the canopy to get a nice smooth line. This will 'average out' any small irregularities in the marking step. I used a piece of the rubber seal for the canopy – worked great.

    6.2. I used a Dremel tool with 1/8 inch cross cut pattern and a little spray of silicone lube. The final cut was cleaned up with a belt sander to the line.

7. Confirm Fit

    7.1. See photos of canopy sitting on the fuselage, after the initial cut and prior to clean up with a belt sander.



8. Optional last step (highly recommended)

    8.1. Sit in the fuselage, admire the view. Engine sounds are optional.