

# Screwless Cowl

From VelocityWiki

The Velocity plans call for the cowling to be attached via countersunk machine screws captured with nut plates. This installation technique works well and has been used on the majority of flying Velocities. It works well.

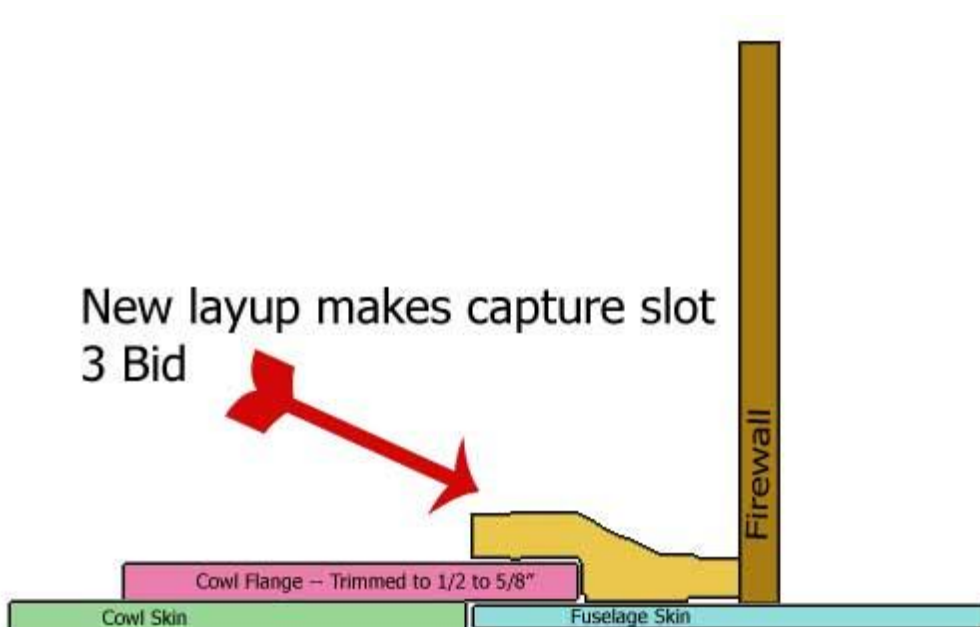
However, for those that like to add cost, complexity, and time to the build, there are advantages to the screwless cowl:

1. The cowl can be removed by pulling six pins; very simple and quick
2. There are no screws to come loose and go through the prop
3. The height challenged owner does not need a step to get to the screws on the top of the cowl
4. It is aesthetically pleasing to the eye
5. It adds that “how the heck did he did do that?” factor for the casual observer

How it is done:

The existing cowl pieces have a flange on the forward face. This is the flange that holds the nut plates for the standard attachment.

- The flange is trimmed back to 1/2" to 5/8".
- The inside surface of the flange is covered with duct tape.
- A three bid layup, three inches wide, is laid from the firewall onto the duct tape.





Cowl slot lay-up on upper cowl.

- Trim the new lay-ups. This forms the slots that capture the cowl flanges.



Lower cowl slot is trimmed flush.



Upper cowl slot is left long.

- The sides of the cowl are attached with three hinge pieces on each side. Top of wing, bottom of wing and cowl-to-cowl aft of wing.

There is a possible "gotcha!" with the wing hinges. Don't get the wing hinges too close to the firewall. The cowl will need to flex outward to de-interlace the hinge for removal. The forward slot will work against the flexing necessary to remove the cowl. If the hinge is too close to the slot, you will not be able to remove the cowl. I kept my hinge 7 inches back.



I used machined aircraft hinge. If I did it again, I would use hardware store grade rolled hinge. The aircraft hinge is expensive and will not loosen over time. The hinge sections are many times stronger than the original screws so are overkill as a fastener.

Upon initial installation, the hinges will be tight; and it will make installation and removal a little more difficult. In this case a "sloppier" fastener would work better. The hardware hinge will "break in" over time, the aircraft version probably won't.



- The existing flanges on the wings are trimmed to be flat at the top.

The lower section of the hinge may need to be sculpted to fit. The hinge pieces are bonded on one side at a time. E.g. bond one half of the hinge to the wing flange. When cured, install the cowl, prep the upper hinge piece with adhesive, install the hinge piece and pin, install clecos, finish by removing excess adhesive with scrapers and acetone.





- Bond the hinges to the inside of the flange and the inside of the cowl.

I drilled the cowl and hinges and held them in place with clecos while they were bonding. I used ES-6228 Aeropoxy Structural adhesive for bonding.



- After the hinges are bonded in place, countersink the cleco holes and install 1/8" pop-rivets.



It happens that the hinge pin on the 1" aircraft hinge happens to be the right diameter to be tapped 4-40. I made small handles out of aluminum stock. I drilled and tapped them 4-40. A small drop of Lock-Tite and the handles were ready for use.

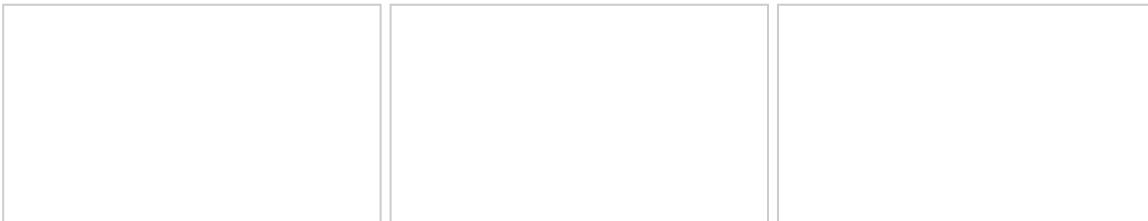


The cowl attached with forward tabs/slots and six hinges.

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I had gotten the idea to do this from Craig Woolston and John Schrool's Velocity

Pictures from their installation:





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