

Notes on fitting airbrakes
By Bud Yerly
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The mechanical limit for the airbrake closed position is the lateral (spanwise) rod end bearing contacting the chordwise push rod. Normally they clear one another by about 1/8 inch. The open limit is obviously the stop on the bell crank. The airframe limit for the airbrake is the airbrake fit and hinging itself. Obviously you can't fit an airbrake mechanism unless the airbrake fits the rebate flawlessly. If it doesn't, grind, cut and rebuild as appropriate.

The normal reason for not being able to achieve even 57 degrees is the placement of the brackets on the airbrake, and or the clearances in the wing airbrake bell crank setup.

My initial setup is to set the airbrake to 60 degrees and the bell crank to the stop and measure the rod length using a stiff wire to measure center to center or rod end to rod end. Once calculated build the push rod with threading allowance for stop nuts and future trimming, then install. At this time check then clearance of the wing holes and bell crank metal supports as required to get it to close properly with the rod attached in final position. Should the airbrake detent for the pushrod and bearing not have been molded correctly, this may require cutting the airbrake slot and re-glassing it back to get proper movement and clearance.

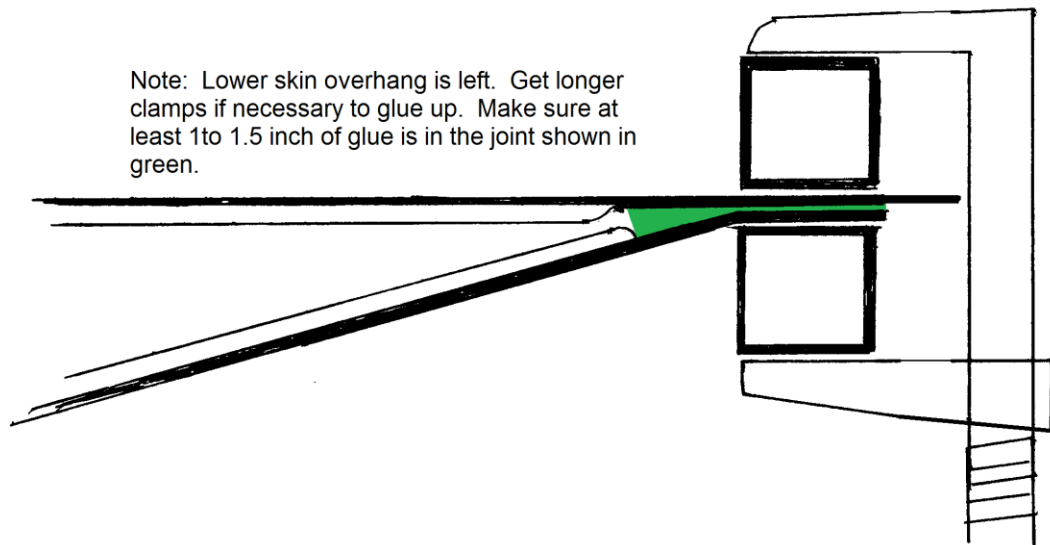
Once the plane is rigged, the angle of the GAB 04 torque tube (which determines the throw length somewhat) can affect your airbrake throw due to handle length, position, mono wheel clearances etc. Again, adjust to fit as required.

Airbrake foam mouldings are shorter in comparison to the wing at the trailing edge. This is clearly evident after construction and requires the builder to modify the length of the airbrake (and sometimes the aileron) to prevent excessive cutting and trailing edge compromise of the glue joint.

Normally it is not recommended to trim the trailing edge of the wing beyond the black overhang of the lower wing skin. With good gluing techniques, the last 3/8 to 1/2 inch of the top and bottom wing skins must be bonded and preferably closer to 1 to 1.5 inches. The overhang of the lower skin section leaves a nice taper if it is approximately 1/4 inch to 3/8 inch long. Fill the void with filler/micro and a taper can be made to about 1/16 inch trailing edge thickness. A razors edge is not necessary and aerodynamically and mechanically is bad technique. With that said, if the airbrake (and aileron) are short of the trailing edge and the entire black overhang is eliminated this makes for a very blunt trailing edge which is unacceptable.

The Custom Flight Solution is to add a small amount to the trailing edge of the airbrake (normally about 3/4 inch) and if necessary modify the wing tip and aileron similarly. Since the wing tip is slightly shorter than the aileron, that means the aileron can simply be tapered on the trailing edge.

See drawings and photo's below:



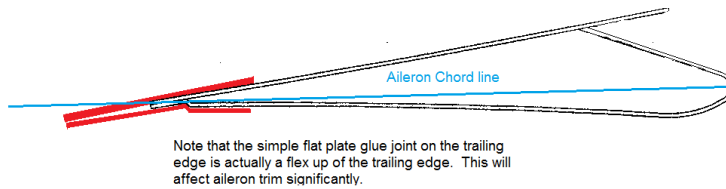
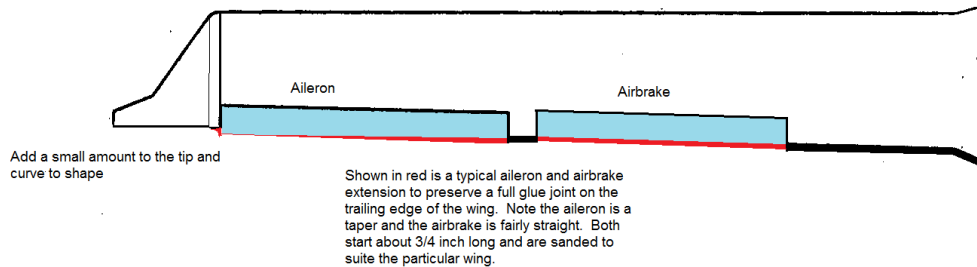
Note that the tab left over of the lower skin (shown upside down) is to be trimmed to match the aileron and airbrake. Should these movable surfaces be significantly shorter than the wing tab, trimming the tab back can lead to very little glue joint on the trailing edge. Should this be the case, add a small extension to your aileron and airbrakes.

Normally the aileron only requires a small extension and mostly to the inboard section.

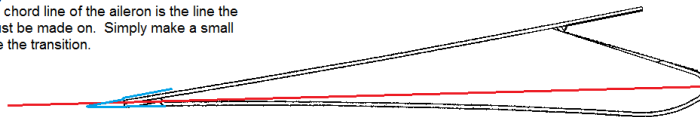
The airbrake is often times too short. The upper surface of the airbrake is concave so adding on to the airbrake can be accomplished by simply using two layers of bid to the lower surface and two to the upper surface and gluing it up on a flat table. Or using a piece of bar stock clamped on.

The aileron is not as easy. The taper of the aileron and that funky little joggle if glassed to a flat table may leave you with a deflection on the trailing edge of the aileron which will be a trim tab. To decrease the shaping and filling to a minimum I angle the aileron just a bit or make a flat stock form to keep the new trailing edge about on the chord line.

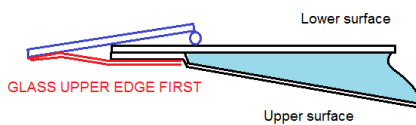
Trailing edge aileron and airbrake trimming on motor gliders



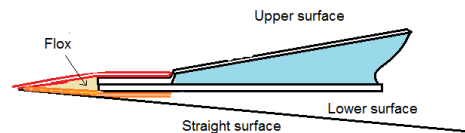
Typical Aileron and airbrake extension:
Do not simply add to the lower surface as this will be a trim tab. The chord line of the aileron is the line the extension must be made on. Simply make a small ramp to make the transition.



Technique One Glass Top side first.



Do not get carried away with the jig. Simply eyeball the slope of the lower surface line to prevent the formation of a trim tab verses an extension.



Use a good flat table and just block up the leading edge and eyeball a straight chord line from leading edge to trailing edge.