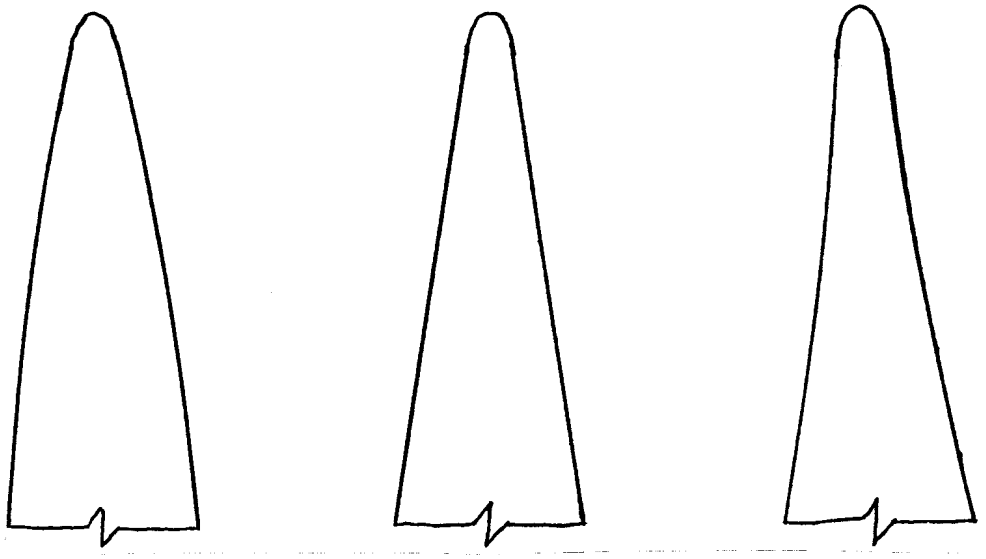
GLASTAR SERVICE BULLETIN 15

MANDATORY

Subject: Rudder trailing edge

Applicability: GlaStar Kits #5002–5316

Discussion: Because of the size of the bend radius along the trailing edge of the rudder skin, some finished GlaStar rudders are ending up with a slight convexity in the trailing edge cross-sectional profile (see Figure 1a). This condition can have a negative effect on the directional stability of the finished aircraft and is thus unacceptable. A tighter bend radius along the trailing edge will produce either a perfectly flat (Figure 1b) or slightly concave cross-sectional profile (Figure 1c), and either of these conditions results in desirable flight characteristics.



UNACCEPTABLE ACCEPTABLE ACCEPTABLE

(A) **(B)** **(C)**

(PROFILES EXAGGERATED FOR CLARITY)

Figure 1: Possible Rudder Trailing Edge Cross-Sectional Profiles

Required Action: No action is required until the rudder assembly is complete; if the trailing edge profile does require correction, this is more easily accomplished after the rudder is finished than beforehand.

Upon completion of the rudder but **before first flight** for GlaStars still under construction or **before further flight** for completed GlaStars, inspect the trailing edge profile by sighting along the trailing edge. If the profile appears flat (as in Figure 1b) or slightly concave (as in Figure 1c), no further action is required. **If the profile appears slightly convex** (as in Figure 1a) **at any point along the trailing edge, then the following corrective procedure is mandatory before flight**:

The convexity of the trailing edge can be corrected quickly and easily using a squeezing tool constructed from two pieces of 2 X 4 lumber hinged together, as shown in Figure 2. Cut two pieces of 2 X 4 approximately **12"** long. Remove any surface irregularities from one narrow edge of each piece on a belt sander or jointer, and then put a generous radius on the corners at the ends of these faces. Join the two pieces with these faces adjacent to one another using a hinge or hinges. Any variety of piano hinge (either hardware-store or aircraft grade) works especially well, but 2–4 strap hinges (depending on size) will work fine, too. Set the gap between the 2 X 4s at about **1/8"** and secure the hinges with sheetrock screws.

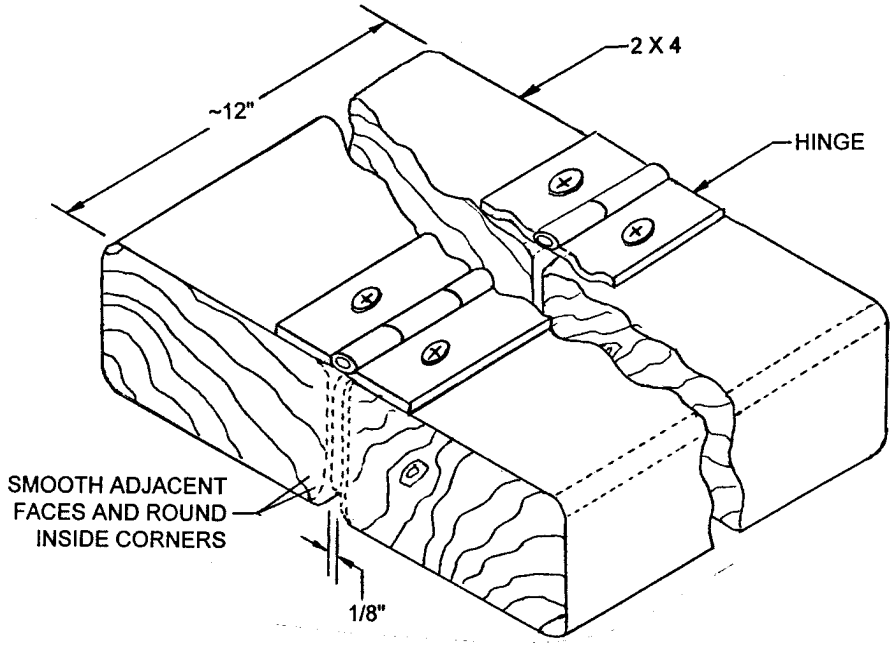


Figure 2: Tool for Tightening Trailing Edge Bend Radius

Figure 3 shows how the tool is applied to the trailing edge of the rudder to tighten the radius of the trailing edge bend and thus to remove the convexity from the trailing edge profile. Work the tool gradually along the entire trailing edge, moving it 6–8" each time. Each squeeze of the tool should overlap the one before it Only very moderate pressure is required; it's much better to make two or three passes along the trailing edge pressing gently than to try to do the entire job in one pass.

Check the trailing edge profile after each complete pass. When the convexity disappears, stop.

Caution Squeezing the tool too hard can result in kinks or waves in the trailing edge. These problems will also result if you fail to round the inside corners of the blocks, as shown in Figure 2. Be aware that the skin will yield more easily near the ends than it will in the middle; relatively greater pressure may be required in the middle of the trailing edge.

If you wish to eliminate the risk of kinking the trailing edge, you can build a tool similar in design to the one described above, but using boards long enough to crimp the entire length of the skin at once. However, such a tool will require exceptionally straight lumber. Also, it will need to be clamped to a bench top or in a vise, and you'll have to fashion extension handles on the unclamped board to provide enough leverage to crimp the skin successfully.

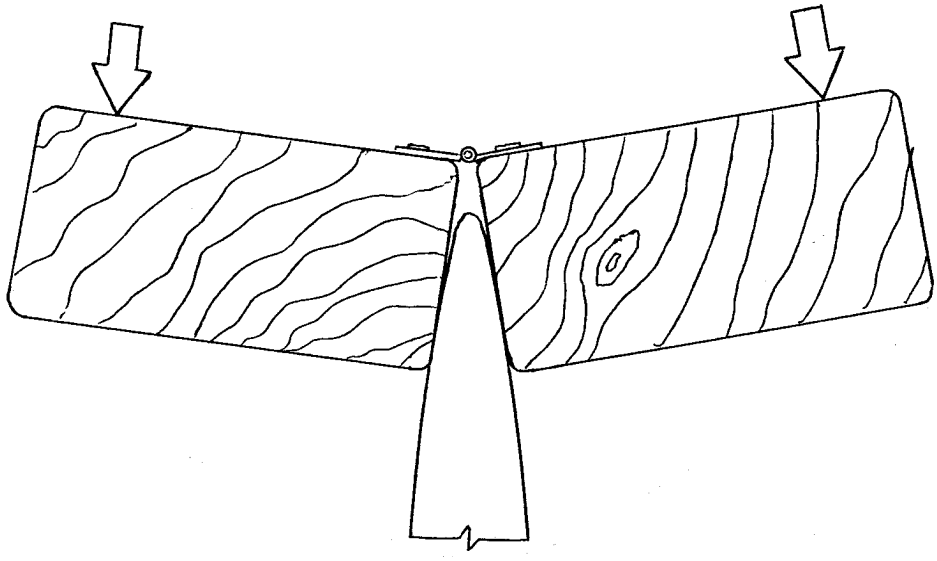


Figure 3: Tightening the Trailing Edge Radius