SERVICE BULLETIN 54

SUBJECT: ELEVATOR COUNTERWEIGHT ARM MODIFICATION

APPLICATION: All Glasair III and Glasair II elevators shipped prior to 07/01/88

DESCRIPTION:

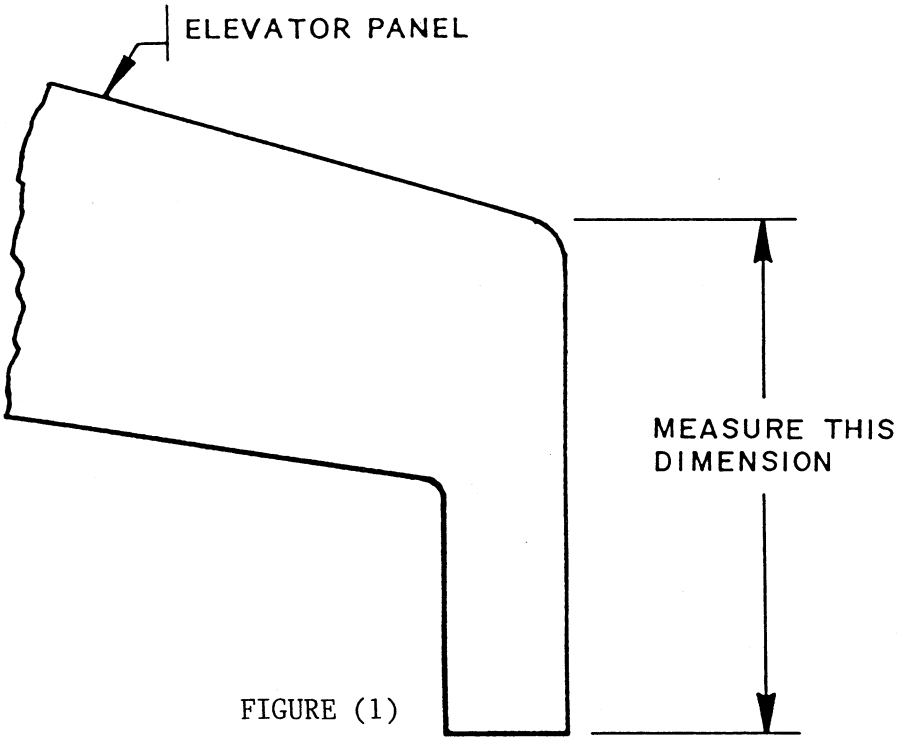

FIGURE (1)

Many builders have been unable to fit sufficient quantities of lead shot into the elevator counterweight arms to satisfy the elevator static balance requirements. If your Glasair kit was shipped before 07/01/88, measure the length of the elevator counterweight arms, as shown in FIGURE (1). If the counterweight arms are less than 13" long (before closing the leading edges, as described in Step N-2), you must provide for heavier counterweights by completing the procedures in this Service Bulletin. If the counterweight arms are approximately 13-1/2" to 13-3/4" long, you have the newer elevator panels and no modifications are necessary; assemble the elevators as described in the original Instruction Manuals.

NOTE: The procedures for balancing the elevators have been changed for all Glasair II and Glasair III aircraft, as follows:

To check the elevator static balance, disconnect both elevators from the elevator actuator arm and check their balance individually by hinging them to the stabilizer. Adjust the weight in each counterweight arm until the elevator is slightly overbalanced: if held in its neutral position and released, the trailing edge should rise slowly. The overbalance condition provides for the weight that will be added when the surfaces are painted. After painting, weight can easily be removed from the counterweights (by drilling out some of the lead) to achieve a perfect static balance.

SOLUTION: The counterweight modification depends on whether or not the original lead shot counterweight has been installed. If the lead shot has not been installed, the builder has the option of using the existing counterweight arm configuration and installing a solid lead counterweight instead of lead shot (lead shot is 30-40% less dense than solid lead), or lengthening the counterweight arm by 1" to provide additional space for the lead shot. If the lead shot has already been installed, the builder must lengthen the counterweight arm to provide space for additional lead shot (unless he chooses to remove the original lead shot counterweight and proceed with one of the options listed above for the situation in which the lead has not been installed.)

PROCEDURE:

A. SOLID LEAD COUNTERWEIGHT FOR UNCOMPLETED ELEVATORS

1. Complete the elevator construction through Step N-3 of the Instruction Manuals in which a four-layer laminate is applied to the inside of the counterweight tip.

2. Line the inside of the counterweight arm with plastic wrap to keep it clean. Then make an impression of its shape by packing its forward end with modeling clay. Bring the clay to within 3/8" of the inboard edge of the counterweight arm and extend it aft to about 4" from the tip. This will result in a counterweight that is slightly oversize, to allow for later trimming. When finished, things should look similar to FIGURE (B-46), with modeling clay where the lead shot is shown in the illustration and without any of the close-out laminates.

3. Remove the clay from the counterweight arm by gently lifting the edges of the plastic wrap. Be careful not to distort the clay's shape. Leave the plastic wrap on the clay and place it on a scrap of plywood with the inboard surface of the clay (the surface that was parallel to and 3/8" from the inboard edge of the counterweight arm) down against the plywood.

4. Make a simple wooden frame, as shown in FIGURE (2), and place it on the plywood so the clay pattern is approximately centered inside it, then fill the void between the frame and the clay pattern with mortar to make a mold in which to cast the actual lead counterweight. Let the mortar fully cure.

5. Invert the mold, remove the clay pattern and the plastic wrap. Make sure the inside of the mold is clean and dry. Melt a sufficient quantity of lead (shot from the kit, old wheel balance weights, etc.), fill the mold, and let it cool.

WARNING: Wear heavy gloves, eye protection, and a heavy apron when pouring the lead. Keep a fire extinquisher nearby. Make sure the mold is ABSOLUTELY DRY before you pour the lead. The hot lead could cause any residual moisture to boil and explode the mold.

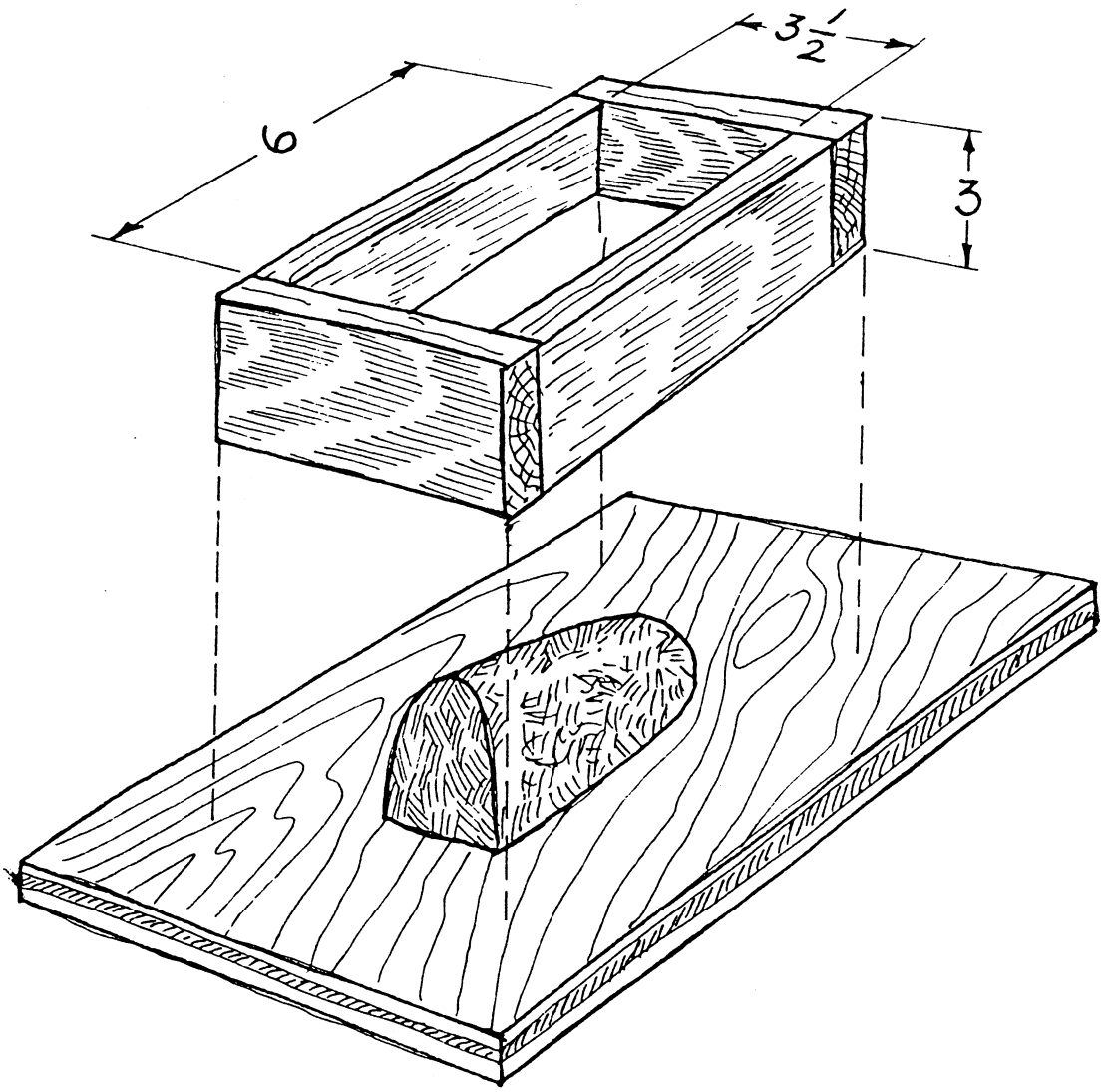

FIGURE (2)

6. Remove the lead weight from the mold and dress its surface if necessary to fit the counterweight arm. Assemble each elevator individually to the stabilizer and trim the weight a little at a time until the elevator is slightly overbalanced: if held in its neutral position and released, the trailing edge should rise slowly.

7. Bond the weight into the counterweight arm with a thin Cabosil mixture, and then form fillets in the corners between the lead weight and the inside surfaces of the counterweight arm. Apply a four-layer laminate onto the aft face of the lead weight, lapping for 1" onto the inside of the counterweight arm, as described in FIGURE (B-46) and Step N-4. Apply a four-layer laminate to the inboard surface of the weight, as described in FIGURE (B-46) and Step N-6.

8. Cap the inboard side of the counterweight arm as described in Subdivision M in the ELEVATOR ASSEMBLY section of the Instruction Manuals.

NOTE: Thanks to Russ Cooper, Glasair II FT #1077, who provided us with a description of the solid lead counterweight procedures.

B. COUNTERWEIGHT ARM LEADING EDGE EXTENSION FOR UNCOMPLETED ELEVATORS

1. In Step N-2 of the ELEVATOR ASSEMBLY section in the Instruction Manuals, bond a 1-1/2" thick block of foam onto the forward end of the counterweight arm instead of the 1/2" thick block called for.

2. Proceed with the rest of the elevator construction, as described in the Instruction Manuals.

C. COUNTERWEIGHT ARM EXTENSION--LEAD WEIGHT ALREADY INSTALLED

The leading edge can be lengthened by bonding a 1" thick block of 4.5 lb. foam to the leading edge of the existing elevator counterweight arm.

1. Sand the primer off the forward 2" of the counterweight arm all around, as shown in FIGURE (3). Carefully scarf (taper) the 2" long area to prevent a thick build-up of laminates.

2. Shorten the stabilizer tips as necessary to clear the foam counterweight extensions (described next). Provide 1/4" of clearance between the foam and the stabilizer tip to achieve a 3/16" clearance after applying the four-layer laminates.

3. Lightly bond a 1" thick block of foam to the leading edge of the counterweight arm. Shape the foam to contour smoothly into the existing counterweight arm and to match the existing stabilizer tip. To simplify removing the foam later, apply polypropylene tape to the surfaces of the foam extension. Do NOT let the tape lap onto the fiberglass counterweight arm laminates.

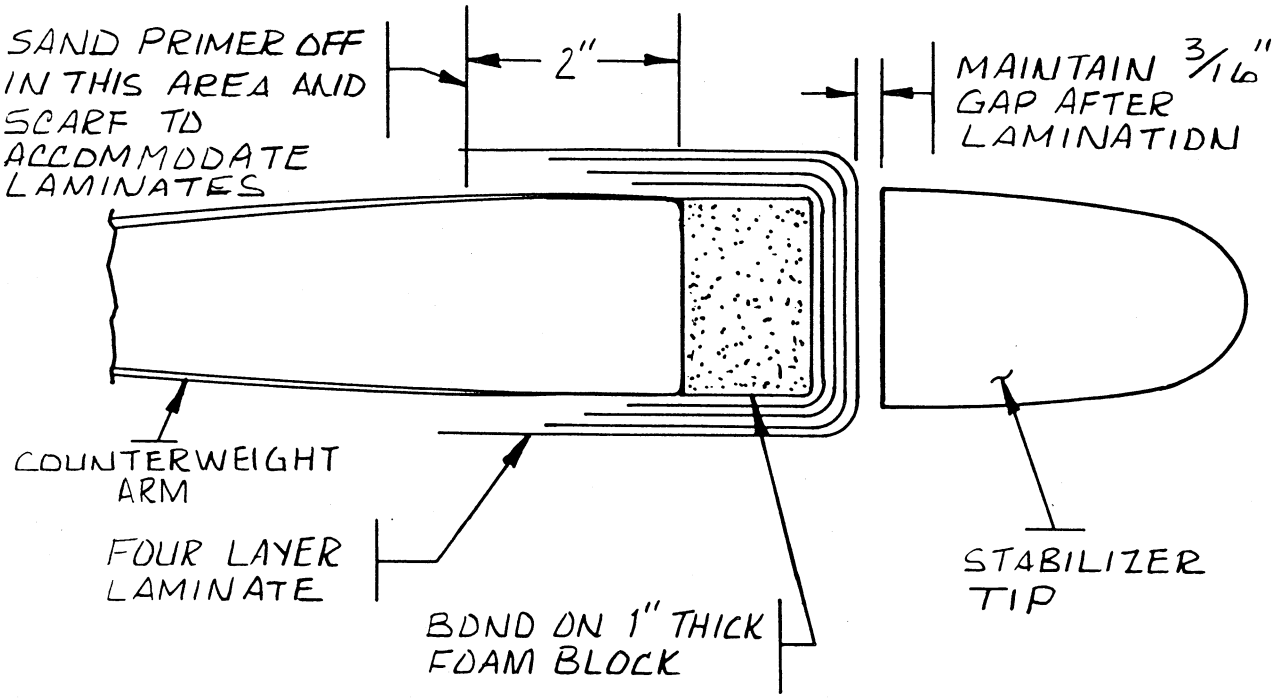

FIGURE (3)

4. Apply a staggered four-layer laminate over the foam, as shown in FIGURE (3), on all but the inboard surface of the counterweight arm. Lap the first layer 1/2" onto the previously scarfed counterweight arm laminates. Cut each succeeding layer 1/2" longer so that the finished four layer laminate tapers smoothly into the existing counterweight arm. Let cure. Trim the laminates even with the inboard edge of the foam in the green cure state.

5. Working from the inboard side of the counterweight arm, remove the 1" thick block of foam.

6. Fill the resulting cavity (where the foam was removed) with a lead shot/resin mixture in a similar manner as the original counterweight.

7. Balance the elevators as described at the bottom of page 1 of this Service Bulletin.

8. Apply a four-layer laminate on the inboard surface of the counterweight arm to secure the additional lead shot.

9. Use body putty or a thick Q-cell mixture to fill and contour the counterweight arm in preparation for painting.