

SERVICE BULLETIN 53

SUBJECT: POSSIBLE INTERFERENCE BETWEEN ELEVATOR ACTUATOR ARM AND RUDDER ACTUATOR LINKAGE

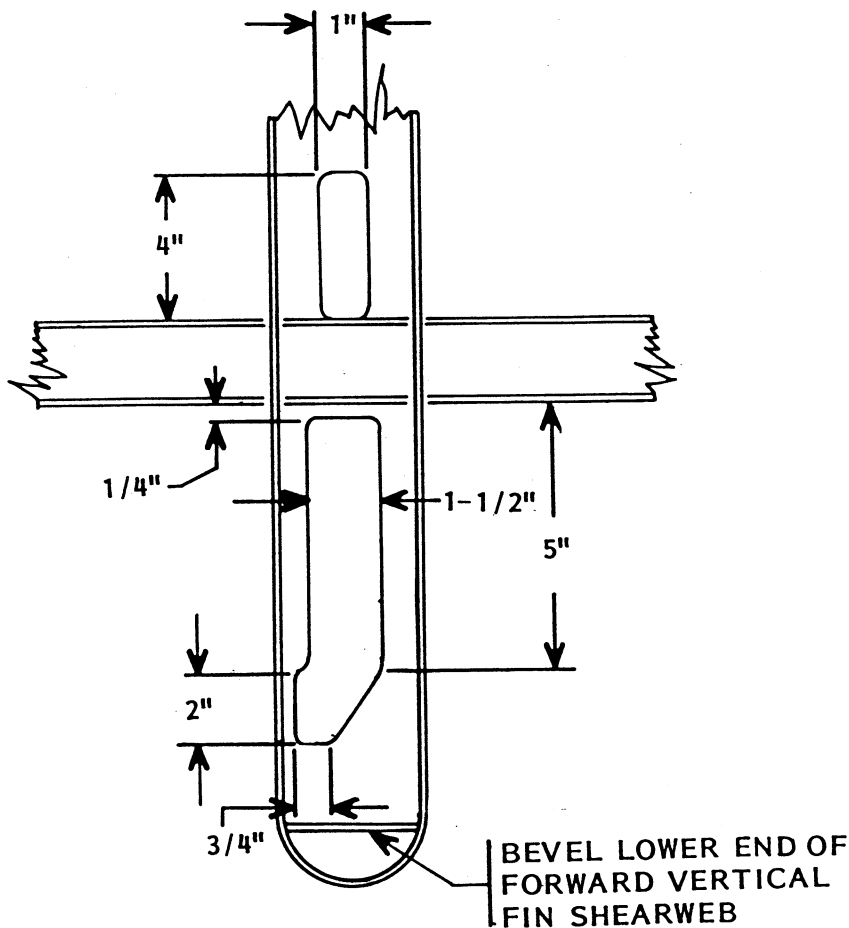
APPLICATION: ALL GLASAIR II AND GLASAIR III AIRCRAFT

DESCRIPTION: There is a potential problem with interference between the rudder actuator linkage and the elevator actuator arm. In the worst case condition (full up elevator and full left rudder) the two components can contact each other.

COMPLIANCE: MANDATORY

SOLUTION: The solution depends on whether or not the rudder panel has been closed.

RUDDER PANEL NOT YET CLOSED:



VIEW LOOKING FORWARD

FIGURE (1)

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MODEL
GLASAIR

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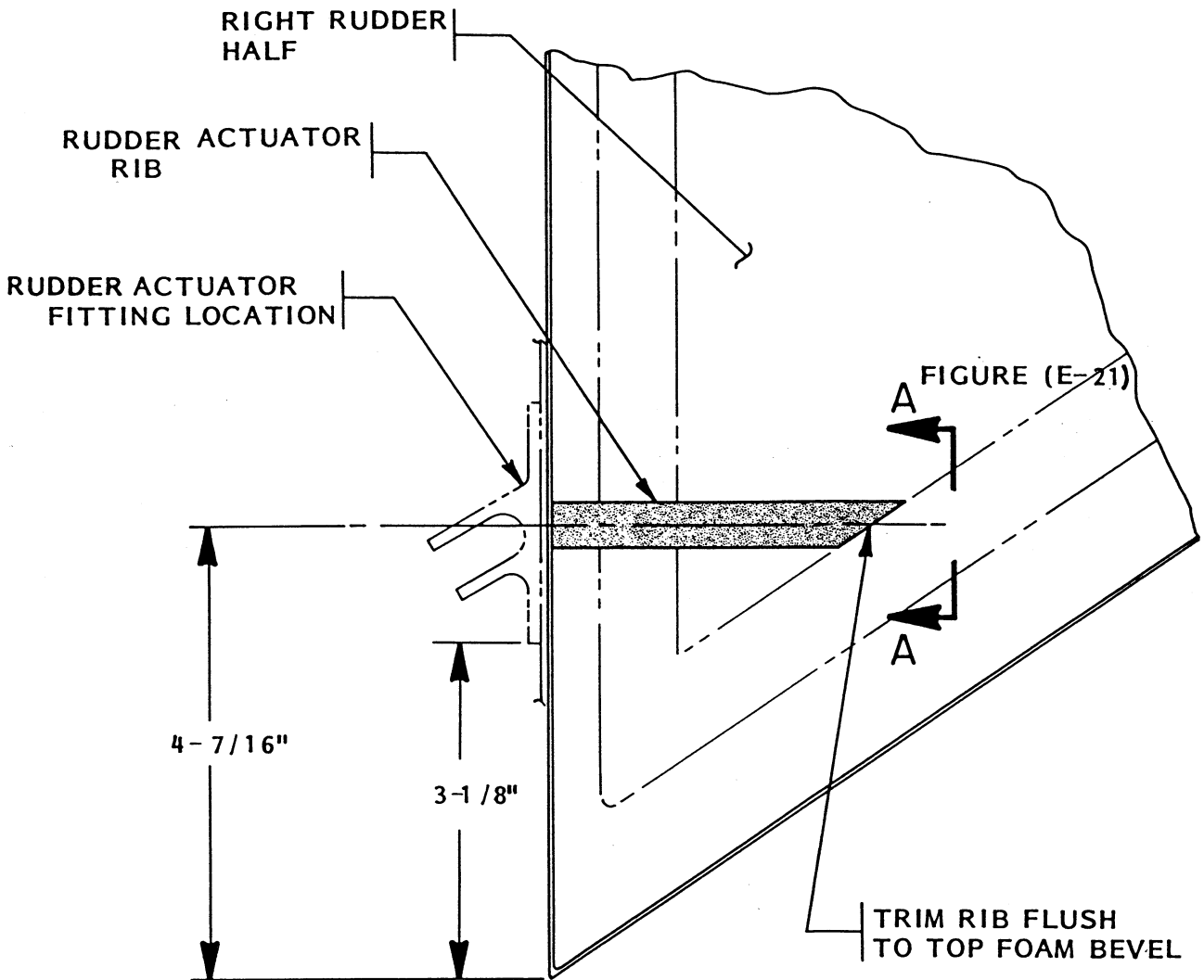


FIGURE (2)

1. When fabricating the rudder, position the rudder actuator rib and rudder actuator fitting 4-7/16" up from the bottom of the rudder as shown in FIGURE (2) of this Service Bulletin rather than the 5" shown in FIGURE (E-20) on page E-24 of the RUDDER ASSEMBLY section in the Instruction Manuals.

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2. Relieve the vertical fin shearweb to clear the rudder actuator linkage, as shown in FIGURE (1) of this Service Bulletin rather than as shown near the end of the HORIZONTAL STABILIZER INSTALLATION subsection in the Fuselage Assembly section of the Instruction Manuals. (Glasair III: FIGURE (D-80); Glasair II TD: FIGURE (D-109); Glasair II FT: FIGURE (D-91); Glasair II RG: FIGURE (D-76).)

RUDDER PANEL CLOSED:

Install the rudder and move it through its full range of travel (24° to the left) with the elevator in the full up position (30° up). If there is no binding between the rudder actuator linkage and the elevator actuator arm, then no modifications are necessary. If binding or contact occurs between the two linkages, the rudder actuator fitting must be relocated as described below.

1. Remove the rudder from the airplane. Unbolt the rudder actuator fitting from the rudder shearweb. Remove the rudder hinge pin keeper from the rudder by drilling out the rivets that secure it.
2. Relieve the vertical fin shearweb as shown in FIGURE (1) of this Service Bulletin.
3. Position the center of the rudder actuator fitting 4-7/16" from the bottom of the rudder shearweb, as shown in FIGURE (2) with the bolt hole for the rod end bearing 2" from the hinge line as shown in FIGURE (E-23) in the RUDDER ASSEMBLY section of the Instruction Manuals. Use the bolt holes in the actuator fitting as guides to drill new bolt holes through the rudder shearweb.

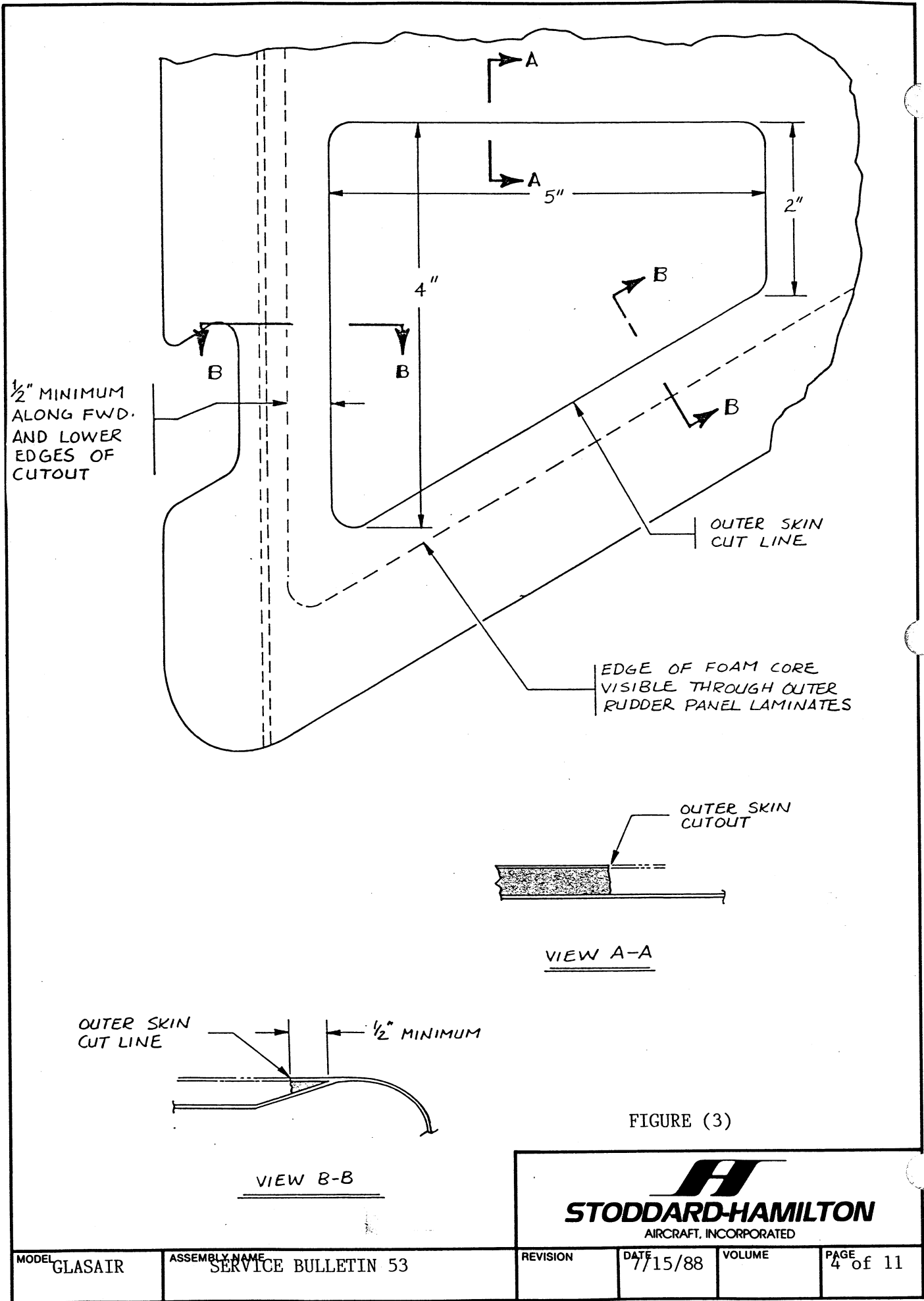
NOTE: One of the holes under the lower linkage attach flange on the fitting is inaccessible for drilling. Since the bolt hole pattern is symmetric, remove the fitting, invert it, insert three bolts through the fitting into the previously drilled holes, and drill the fourth hole.

4. Sand the gray primer off the left side of the rudder along the forward and lower edge of the repair access cutout area shown in FIGURE (3). Sand until the edge of the rudder panel foam core (lighter colored area) is visible through the outer rudder panel laminates. Mark the forward and lower edges of the cutout a minimum of 1/2" inside the edges of the foam core, as shown in FIGURE (3). Mark the rest of the cutout relative to the forward and lower edges as shown, maintaining a minimum 1/4" diameter radius in all the corners, as shown, both to simplify making the cutout and to prevent stress concentrations.

NOTE: Because of the tapering edges of the foam core, limited clearance exists between the outer and inner rudder panel laminates along the forward and lower edges of the access opening. To help ensure that the inner laminates are not damaged, cutting the outside skin for the access opening will be done in two steps.


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1/2" MINIMUM
ALONG FWD.
AND LOWER
EDGES OF
CUTOUT

OUTER SKIN
CUT LINE

EDGE OF FOAM CORE
VISIBLE THROUGH OUTER
RUDDER PANEL LAMINATES

OUTER SKIN
CUTOUT

VIEW A-A

OUTER SKIN
CUT LINE

1/2" MINIMUM

VIEW B-B

FIGURE (3)

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5. Cut the outside skin only along the marked outside skin cut line. We found that the best way to make the cut is with a sharp, hand-held utility knife. Adjust the blade so it extends just a short way beyond the handle to avoid cutting through the inner laminates when making the outside skin cut.

CAUTION: The rudder panel foam core is very thin, especially along the forward and lower edges of the cutout. Be very careful not to cut through the inner rudder panel laminates when making the cutout. Cut just deeply enough to sever the outer laminates.

6. Peel off the outside laminates, and then scrape the foam core off the inside laminates. In order to provide the most room for making the internal repairs, the exterior skin cutout must be enlarged along its forward and lower edges. Enlarge the cutout along these two edges to the edge of the foam core taper, as shown in FIGURE (4). Again be careful not to cut through the inner skin when enlarging the outer skin cutout.
7. Mark the inside skin cut line onto the inner rudder panel laminates 1/2" inside the outer cut line all around, as shown in FIGURE (4). Cut through the inner laminates along the second marked line.
8. Pry or pull up on the edges of the inner cutout laminates to either break them away from the rudder actuator rib or to provide an opening for inserting a saw blade to cut through the rib.

CAUTION: Protect the surrounding rudder panel from damage when breaking away the inner rudder panel laminates.

9. Drill out the rivets securing the rudder actuator fitting nutplates and remove the nutplates.
10. Using the hole in the rudder for access, cut away the original rudder actuator rib. Trim the original rudder actuator rib laminates and foam core flush with the inside of the rudder panel.

CAUTION: Be careful not to damage the original laminates on the inside surfaces of the rudder when cutting away the actuator rib.

11. Fabricate a new rudder actuator rib foam core from 1/2" thick 4.5 lb. foam, using the procedures used in Steps E-1 and E-2 in the RUDDER ASSEMBLY section of the Instruction Manuals as a guide. Fabricate the rib to fit in place 4-7/16" from the bottom of the rudder shearweb, as shown in FIGURE (2) of this Service Bulletin.
12. When fitting properly, seal the foam rib with a thin Q-cell mixture, bond the rib in place with a thick Q-cell mixture using the excess mixture to form a radius in all the corners, and apply the two layer actuator rib laminates, as described in Steps E-3 and E-4 of the RUDDER ASSEMBLY section of the Instruction Manuals. Let cure.


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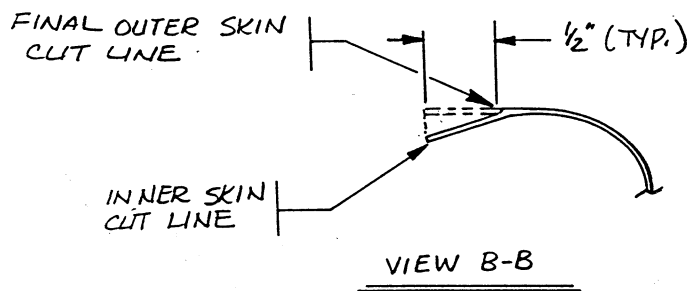
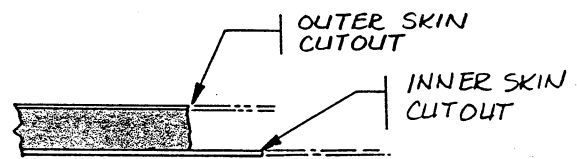
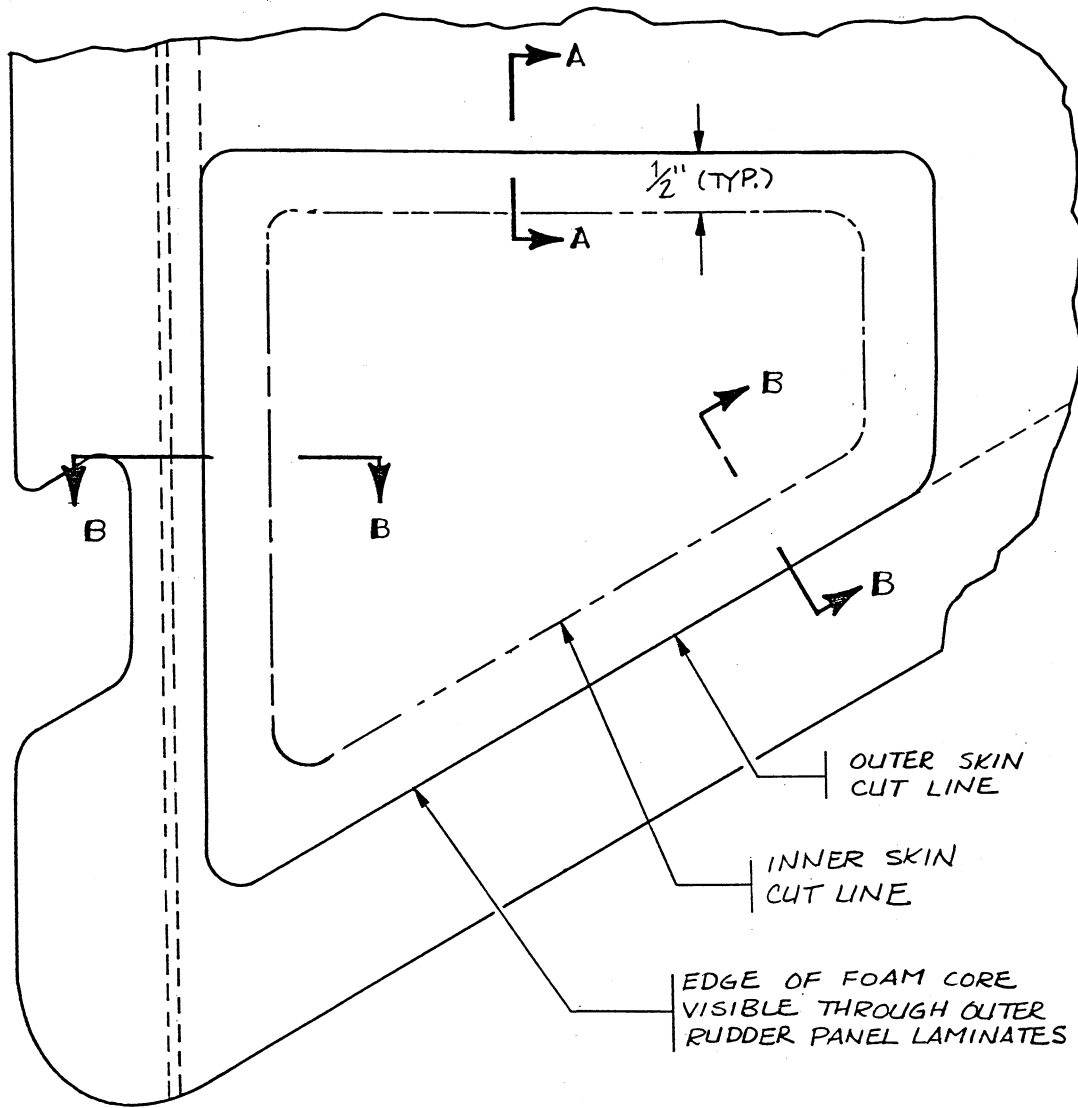


FIGURE (4)

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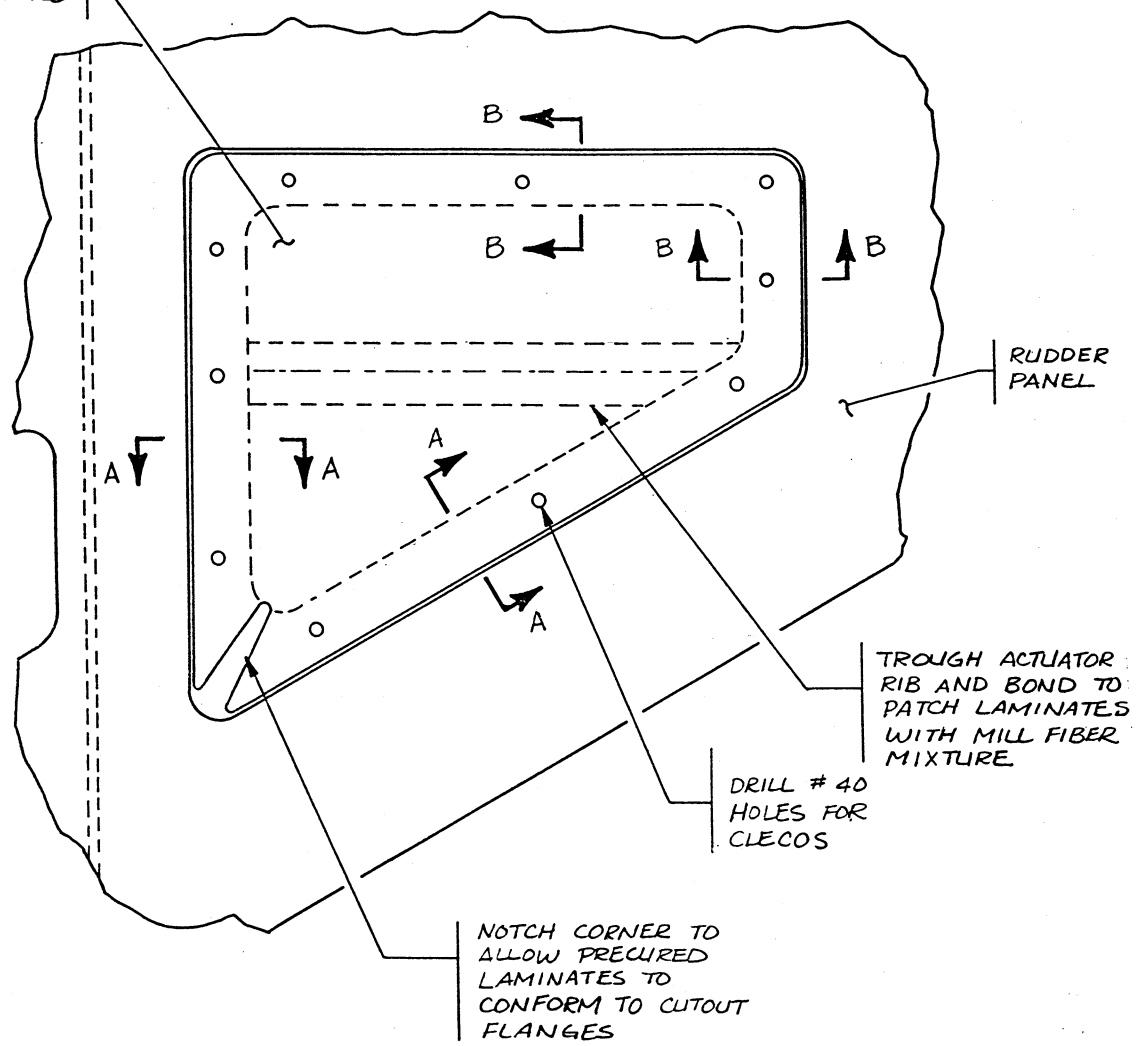
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13. Use the holes drilled in the rudder shearweb in Step 3 as guides to drill holes through the new rudder actuator rib laminates.
14. Install nutplates for the rudder actuator fitting bolts, using small countersunk pull rivets and standard nutplate mounting procedures.
15. Scrape all the foam and Q-cell residue off the access opening flange all around to prepare a good surface for bonding the inner repair laminates.
16. Cut a piece of precured two layer laminate to fit against the flange in the repair access cutout, as shown in FIGURE (5). Fit the piece with its rough side to the inside for bonding against the access cutout flange. Since the flange surrounding the access cutout may be oddly shaped because of the tapering foam core in the area, the precured laminate may have to be flexed to conform to the flange. If necessary, notch the precured laminate to allow different edges to flex in different directions. When fitting satisfactorily, drill several #40 holes through the precured laminate and the access cutout flange along each edge for securing the precured laminate to the access cutout flange while the bonding mixture cures. Sand the smooth surface of the precured laminate piece to provide a good surface for bonding the foam core.
17. Scarf the outside rudder panel laminates all around the repair access panel cutout, as shown in FIGURE (6). This is an important step to maximize the contact area of the final outer repair laminates to the original rudder panel laminates. Since the Glasair II rudder panel has one-layer outer laminates, the scarf width is 3/4" (100 times the skin thickness), as shown; the Glasair III has two-layer outer skins and requires a 1-1/2" wide scarf. Scarfing the laminates is especially difficult in the areas where the rudder panel curves at the leading edge and the lower edge; it may not be possible to achieve the required scarf width in these areas. Do the best you can to sand a uniformly tapered scarf.
18. Trough the upper edge of the rudder actuator rib for the mill-fiber mixture, as described in Step F-8 in the RUDDER ASSEMBLY section of the Instruction Manuals.
19. Vacuum any repair debris out of the rudder interior. Wax enough clecos for all the holes drilled through the patch inner laminates and access cutout flange in Step 16. Mix a small resin/mill-fiber mixture and apply it to the access cutout flange all around. Also use the mill-fiber mixture to fill the troughed upper edge of the actuator rib. Place the precured inner patch laminate in the cutout and secure it to the access cutout flange with the waxed clecos. Weight the center of the patch laminate down against the upper edge of the actuator rib. Clean up excess mill fiber mixture, and let cure.

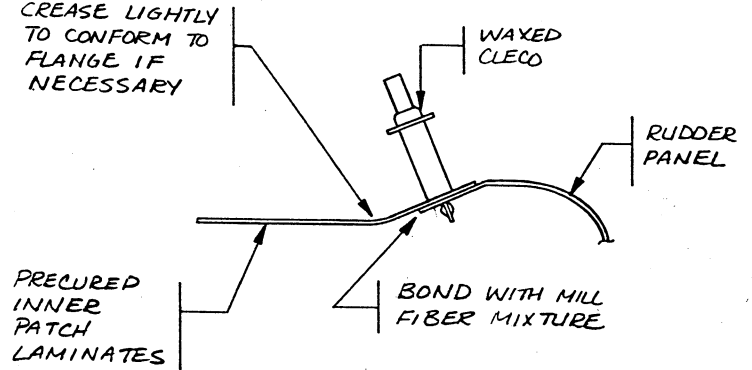


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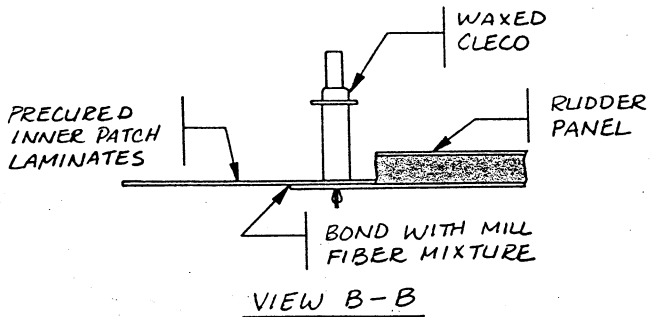
PRECURED INNER
PATCH LAMINATES



CREASE LIGHTLY
TO CONFORM TO
FLANGE IF
NECESSARY



VIEW A-A

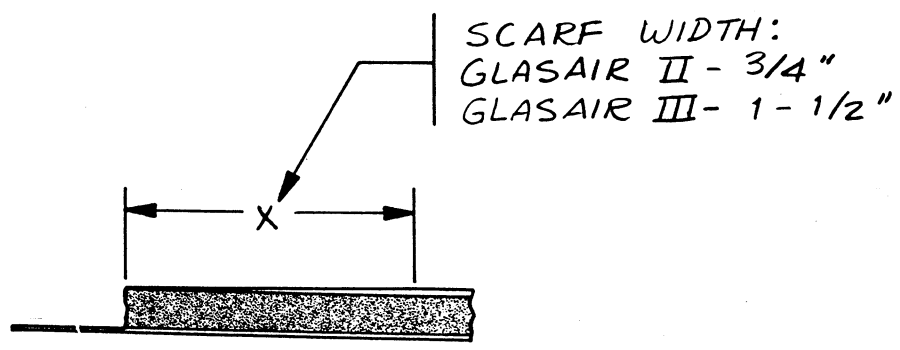
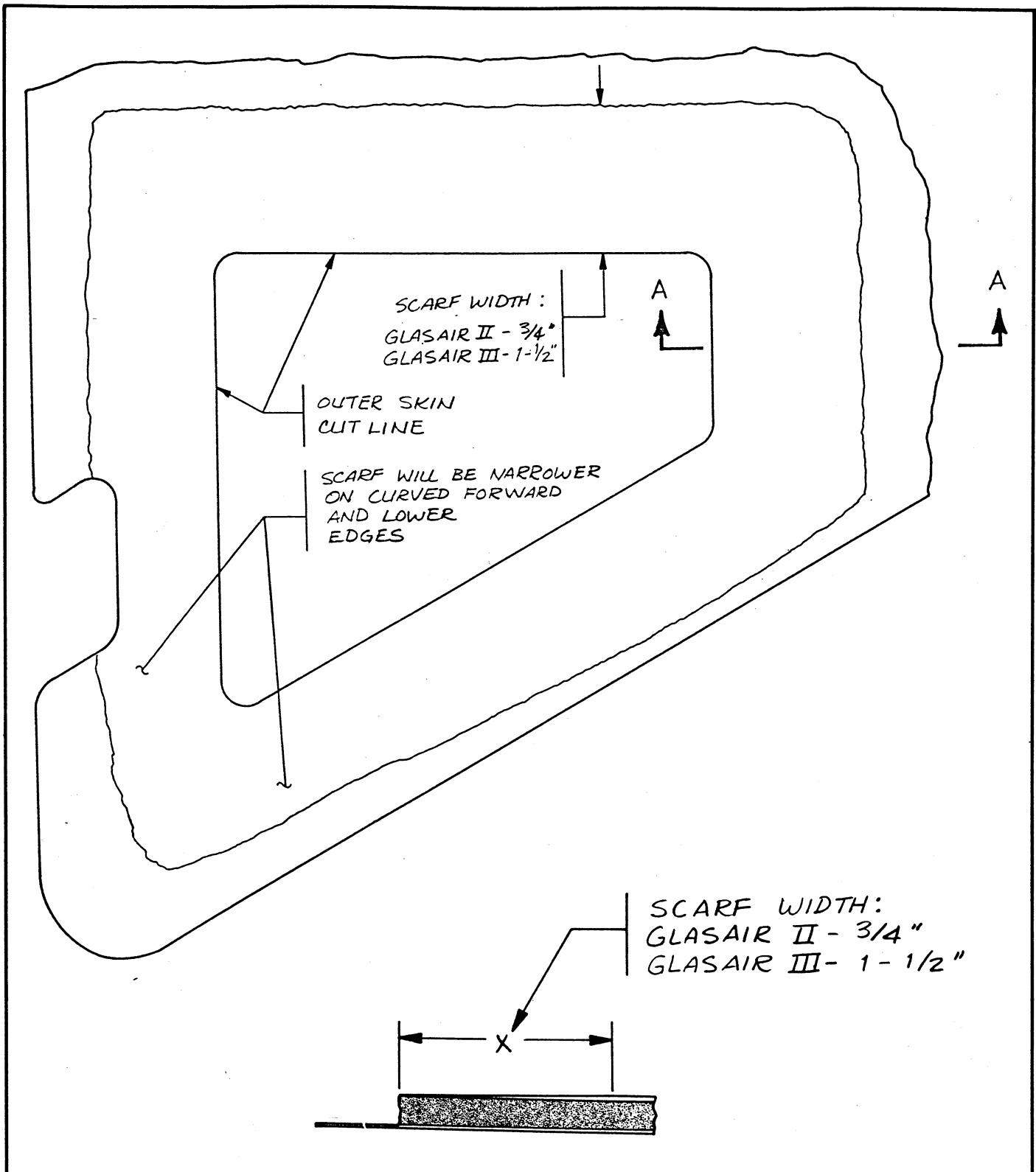


VIEW B-B

FIGURE (5)

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VIEW A-A

FIGURE (6)

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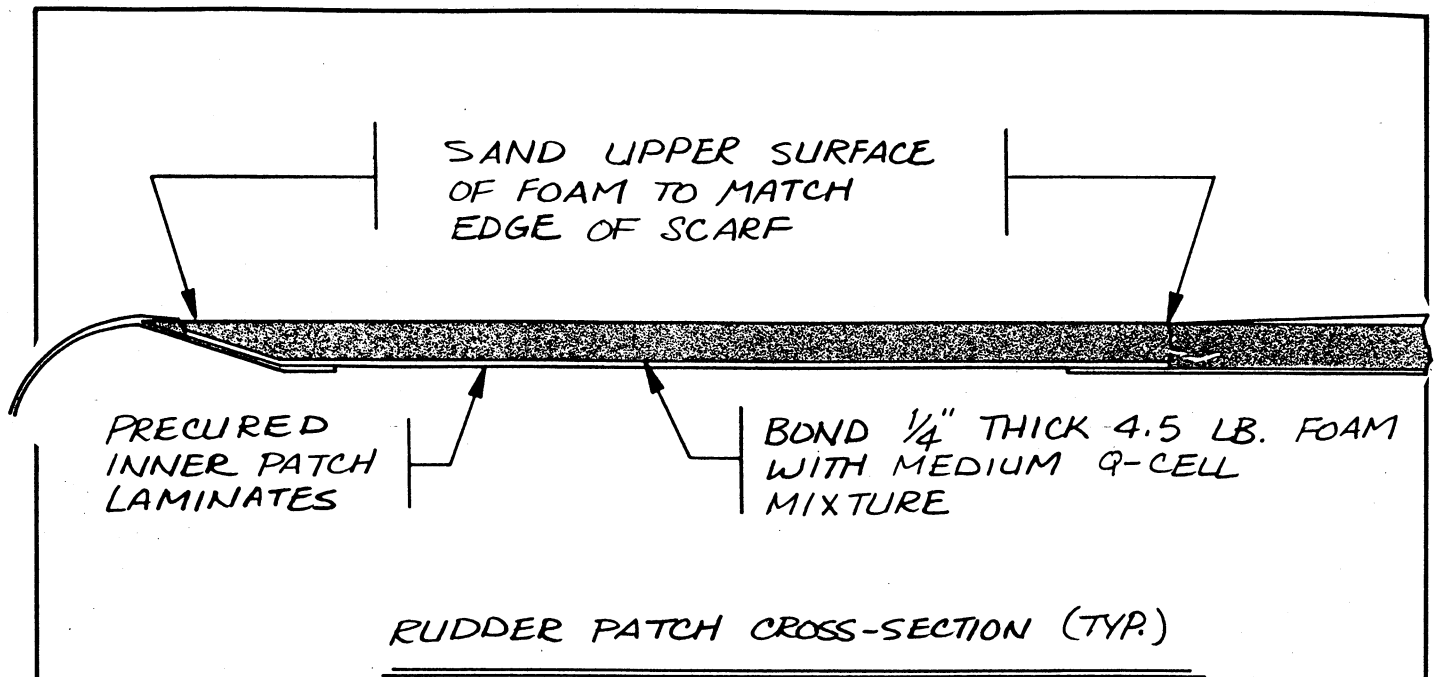

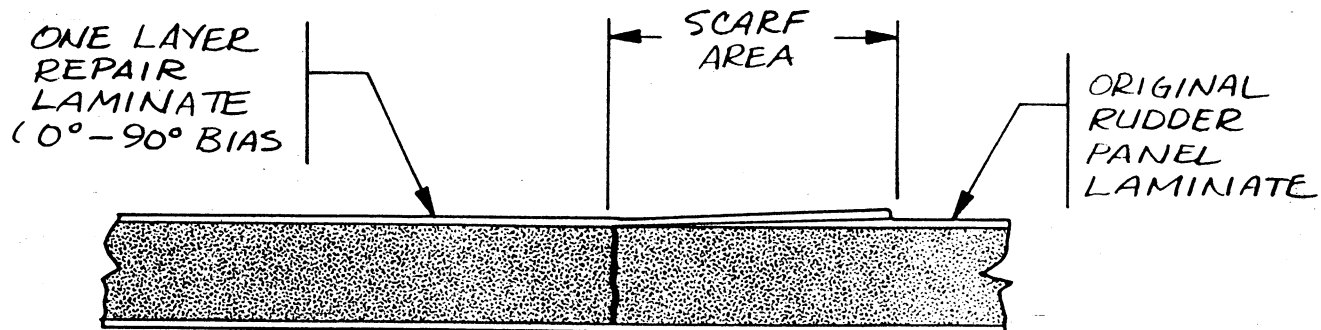


FIGURE (7)

20. Remove the clecos securing the patch laminates. Cut a piece of 1/4" thick 4.5 lb. foam to fit into the repair access cutout, as shown in FIGURE (7). Shape the lower surface of the foam to fit tightly against the irregular surface of the inner laminate piece for its entire area. Use a medium Q-cell mixture to bond the foam piece against the patch inner laminate, weighting the foam in place while the Q-cells cure.
21. When the Q-cells have cured, sand the upper surface of the foam even with the lower edge of the scarf, as shown in FIGURE (7). Seal the upper surface of the foam with a thin Q-cell mixture. Let cure.
22. Glasair II: Apply a one-layer laminate, on the 0-90° bias, over the foam, lapping onto the scarfed area of the original rudder laminates, as shown in FIGURE (8). Let cure.

Glasair III: Apply a one-layer laminate on the 45° bias over the foam, lapping onto the first layer of the two laminates in the scarfed area, as shown in FIGURE (8). Then, apply a one-layer laminate on the 0-90° bias over the first laminate, lapping onto the entire scarfed area, as shown.
23. Use body putty to fill the weave of the patch laminates, and sand smooth in preparation for painting.
24. Reposition and install the hinge pin keeper using (700-0003-002) rivets.

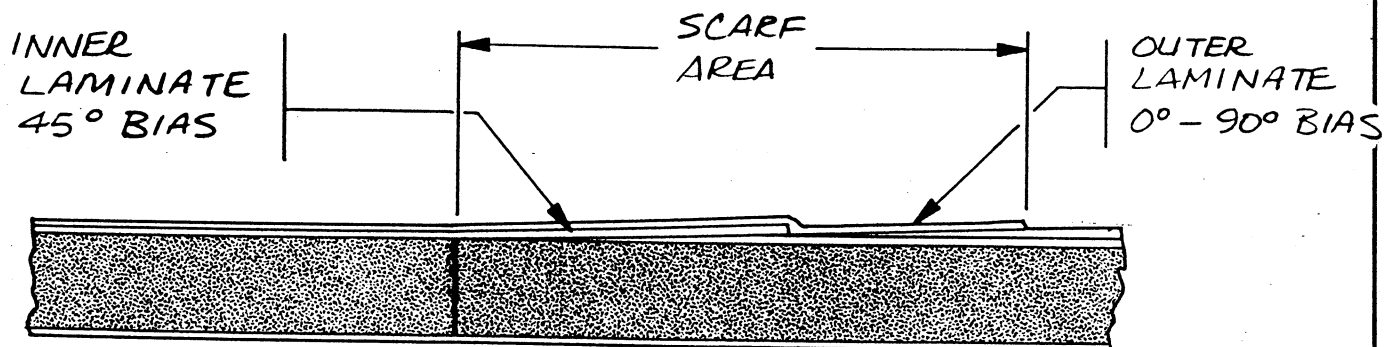
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GLASAIR II

PATCH LAMINATE DETAIL

(LAMINATE THICKNESS EXAGGERATED FOR CLARITY)



GLASAIR III

PATCH LAMINATE DETAIL

(LAMINATE THICKNESS EXAGGERATED FOR CLARITY)

FIGURE (8)

COMPLETED []

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