Section III

TAIL GROUP

3-1. TAIL GROUP.

3-2. The basic tail group structure consists of a full cantilever vertical fin with provisions for the attachment of a fin tip, leading edge, and rudder. The fin assembly is an integral part of the fuselage structure and cannot be detached for repair or replacement without extensive separation of the tail and fuselage structure. Figure 3-1 shows the tail group components and incorporates a reference figure index. Figure 3-2 locates the stations in the fin and rudder structure.

3-3. Fin Interspar Structure.

3-4. The fin assembly consists of riveted high-strength aluminum alloy construction. The structure consists of a built-up leading edge spar and four forged-type spars. Figure 3-3 shows the details of the fin structure. The spars are interconnected by a series of chordwise shear-web ribs and attaching angle clips. The fin inner structure is enveloped by flush riveted aluminum honeycomb core sandwich panels. Additional reinforcement is provided by doublers bounded within the sandwich panel at points of attachment to the spars. Doors are incorporated in the fin plating on the left side to provide access for maintenance and inspection of the bay areas. Figure 3-4 shows the fin and rudder plating. Doors are located at the base of the structure on the right side to provide access for inspection and servicing of equipment within the fin.

3-5. Fin Leading Edge.

3-6. The fin leading edge structure consists of a series of press-formed ribs, reinforcing doublers, and angles as shown on figure 3-5. The structure is divided into four sections, including a "Q" intake section, and a stub section which mates with and attaches to the dorsal fairing. The outer plating is flush riveted to the ribs and angles. The leading edge sections are attached to the fin by screws through gang channel nuts which are riveted to the inner flange of the fin leading edge spar. The basic function of the leading edge is to maintain the airfoil in a given contour to meet aerodynamic requirements. The leading edge has no provisions for thermal anti-icing.

3-7. Fin Tip.

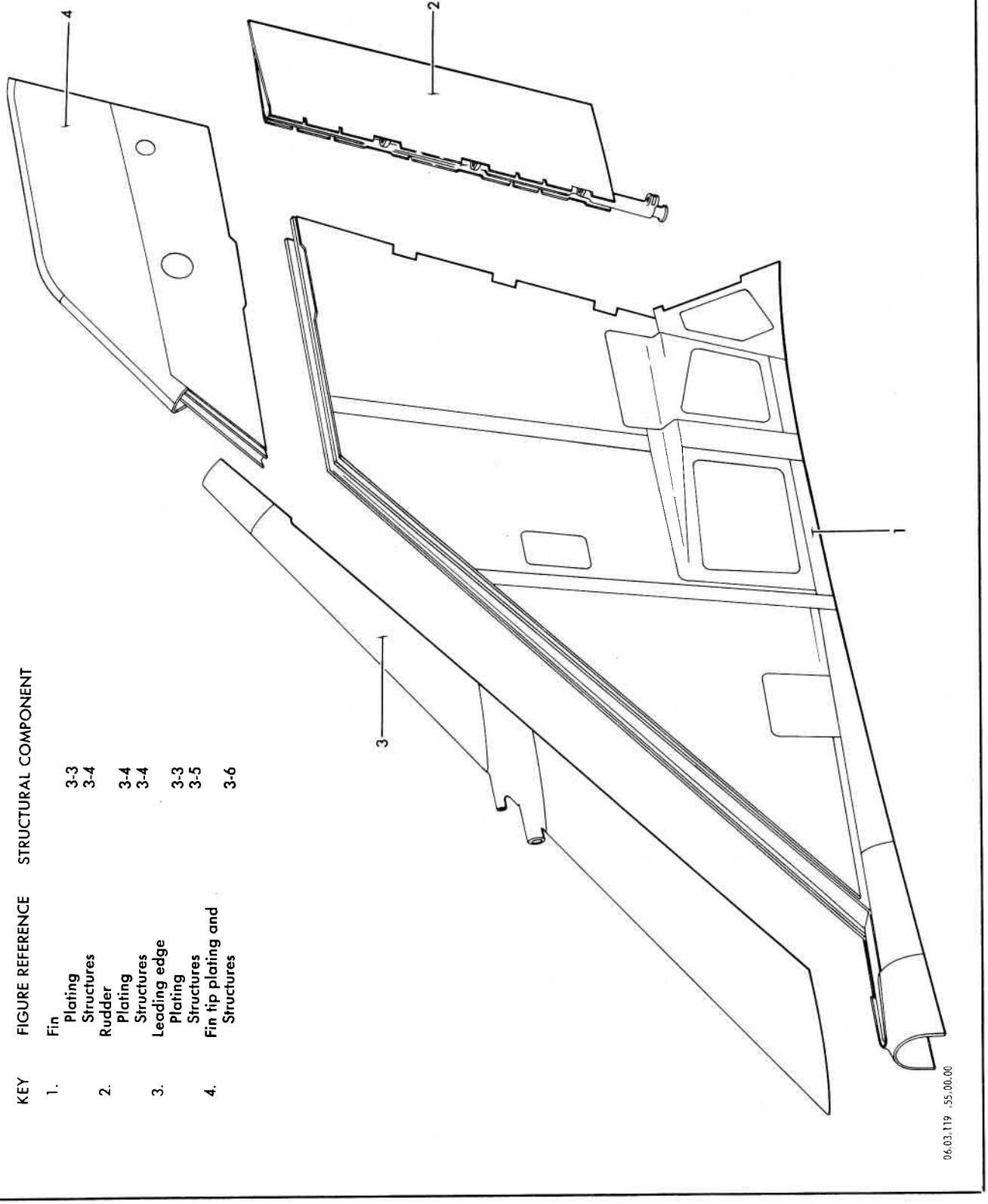
3-8. The fin tip structure is divided into an upper and lower section as shown on figure 3-6. The upper section consists of a fiberglass plastic honeycomb core preformed by routing-out a portion in the center to accommodate the Tacan antenna. The core is sandwiched between glass cloth laminates and bonded with plastic resins. The lower section is constructed of an aluminum honeycomb core sandwiched between aluminum outer skin panels. The panels are flush riveted to the internal structure of the lower section. The upper and lower sections are joined by screws installed through a plate nut channel attached to the inner flange of the lower section's chordwise, preformed channel. The fin tip leading edge spar, located in the lower section, consists of a built-up type "I" section. Gang channel nuts are riveted to the inside of the spar flanges to provide a means of attachment for the upper end of the vertical fin's leading edge. The fin tip is attached to the vertical fin structure with screws installed through a plate nut channel riveted to the inner flanges of a channel that forms the base of the fin tip's lower section. The lower fin tip section houses the IFF antenna.

3-9. Rudder.

3-10. The rudder structure consists basically of perforated aluminum honeycomb core sandwich construction. The details of rudder construction are shown on figure 3-3. The rudder leading edge consists of a press-formed channel spar fitted with three detachable forged hinged fittings and a cast actuator arm near the base of the spar. The upper and lower ends are fitted with channel-type ribs reinforced by doublers. The trailing edge consists of an extruded wedge bonded to the rudder plating. The rudder plating is straight-tapered from 0.072-inch gage at the bottom to 0.023-inch gage at the top. The rudder plating is attached with rivets at the perimeter of the structure and metal bonded in the honeycomb core area.

3-11. INDEXING.

3-12. Figure 3-1 is keyed by tail group components to figures in this section which illustrate and describe either structural features or repairs. Structural components referenced in the index are: fin plating, rudder plating



KEY	FIGURE REFERENCE	STRUCTURAL COMPONENT
1.	Fin	
	Plating	3-3
	Structures	3-4
2.	Rudder	
	Plating	3-4
	Structures	3-4
3.	Leading edge	
	Plating	3-3
	Structures	3-5
4.	Fin tip plating and Structures	3-6

Figure 3-1. Tail Group Components and Figure Index

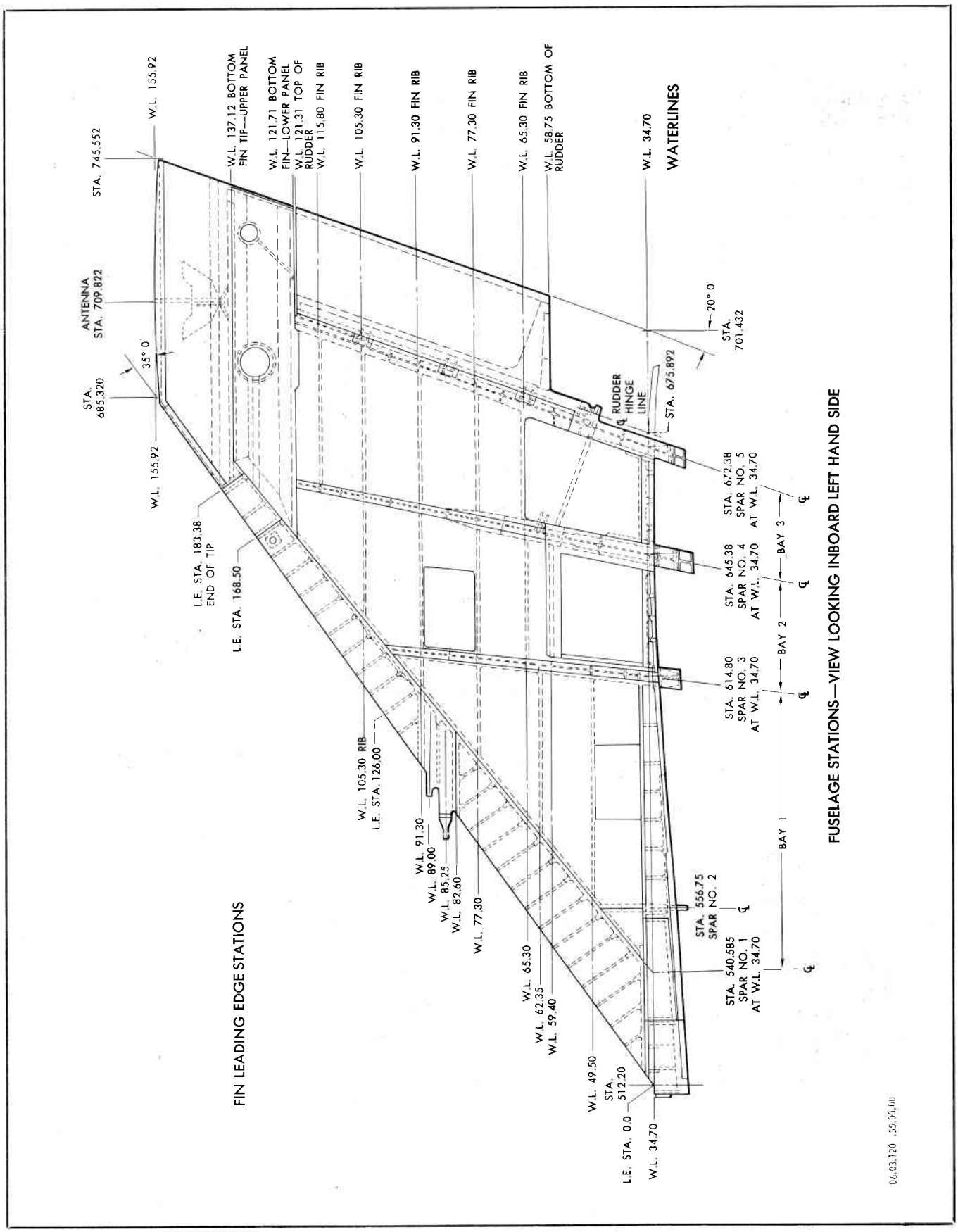


Figure 3-2. Fin and Rudder Station Diagram

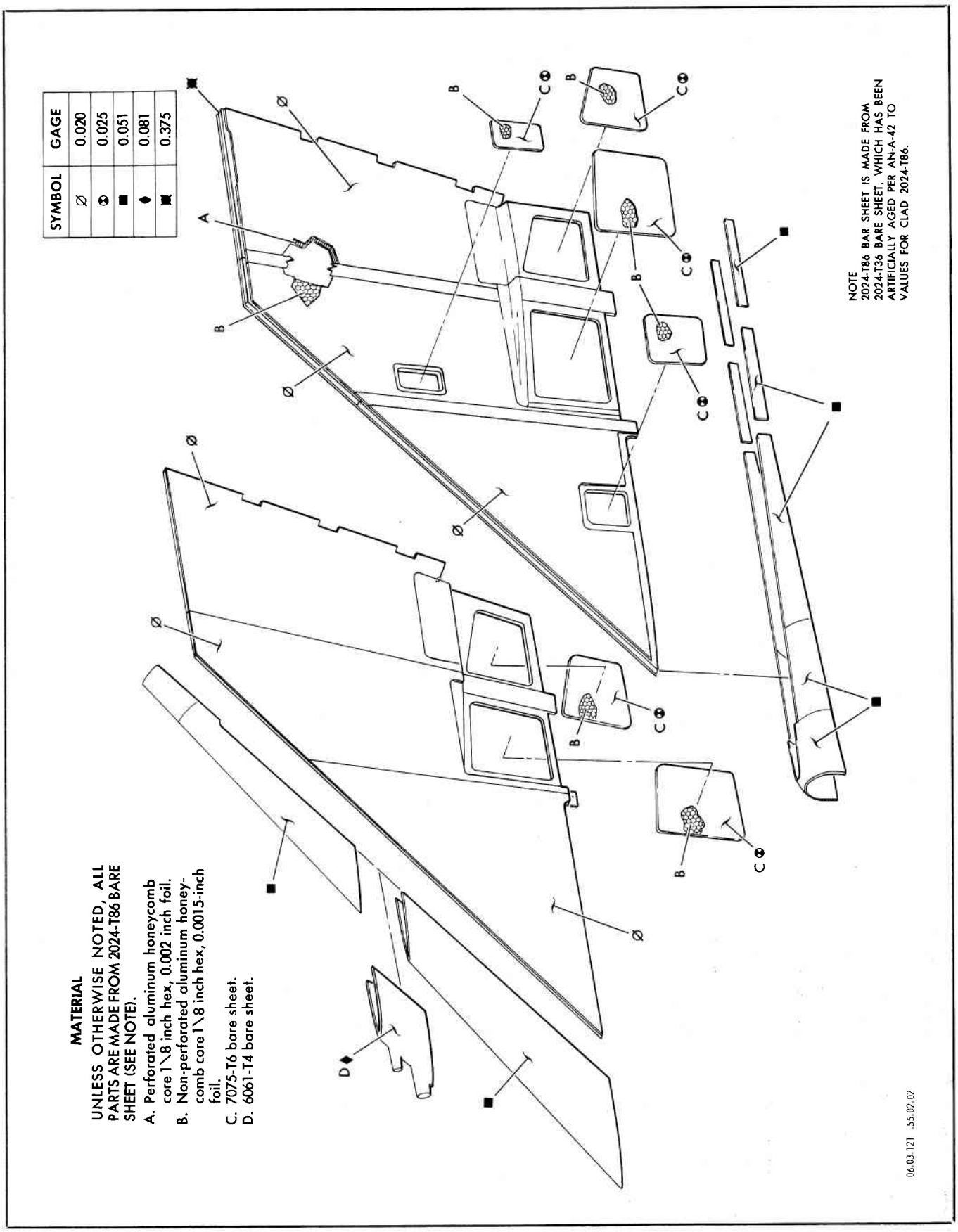


Figure 3-3. Fin Plating Diagram

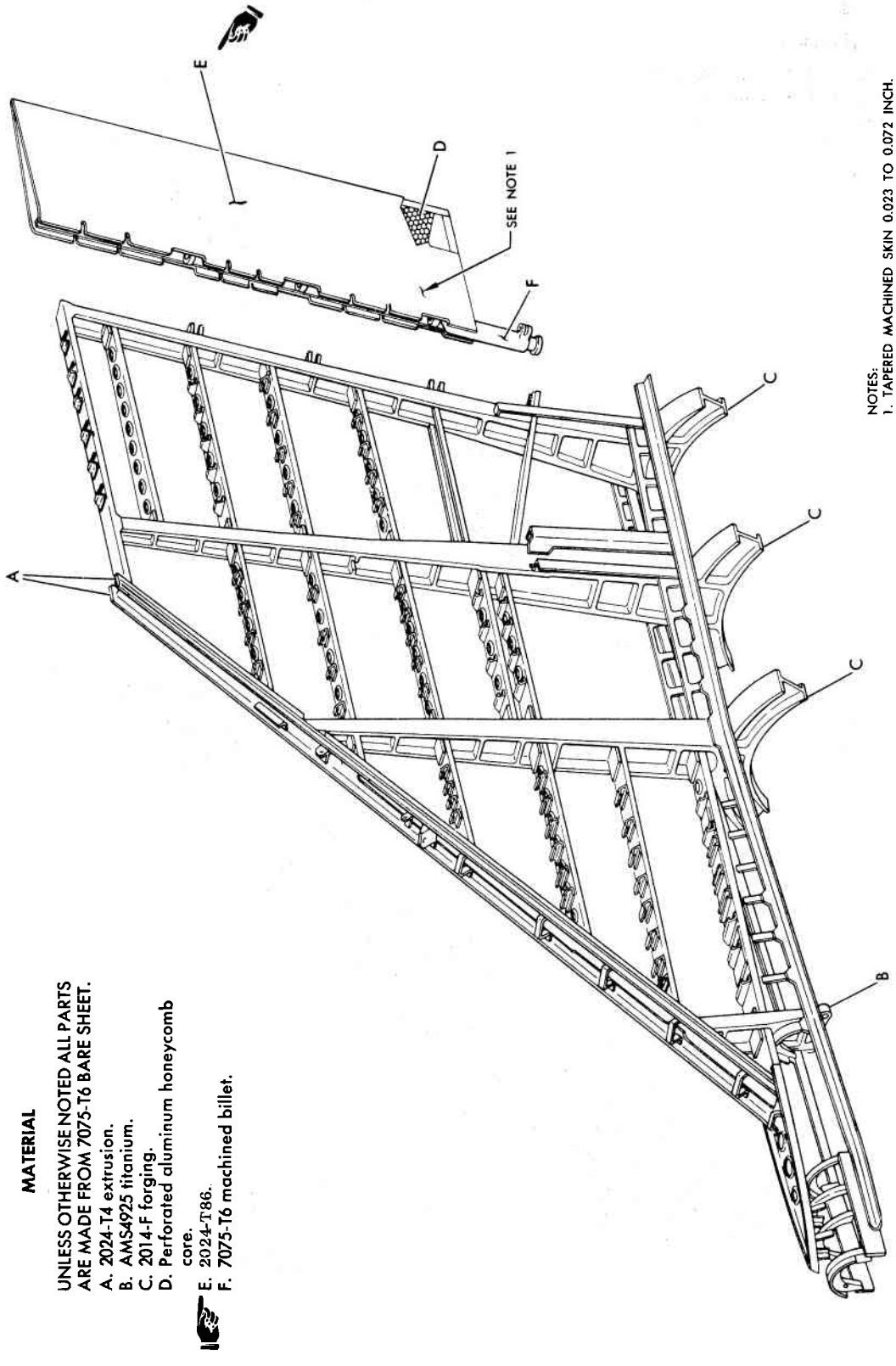
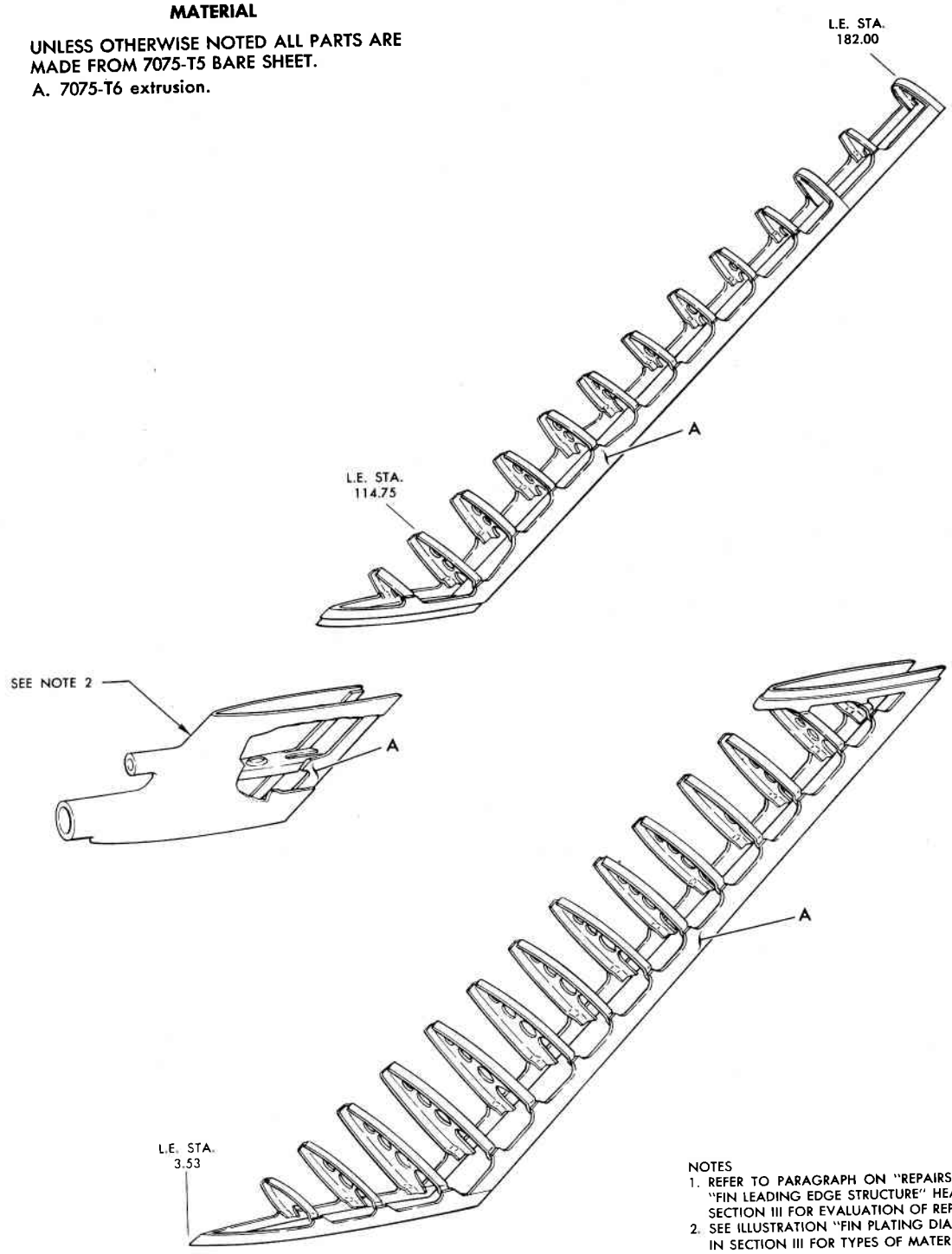


Figure 3-4. Fin and Rudder Structure

MATERIAL

UNLESS OTHERWISE NOTED ALL PARTS ARE MADE FROM 7075-T5 BARE SHEET.
A. 7075-T6 extrusion.



NOTES
1. REFER TO PARAGRAPH ON "REPAIRS" UNDER "FIN LEADING EDGE STRUCTURE" HEADING IN SECTION III FOR EVALUATION OF REPAIRS.
2. SEE ILLUSTRATION "FIN PLATING DIAGRAM" IN SECTION III FOR TYPES OF MATERIAL USED FOR PLATING.

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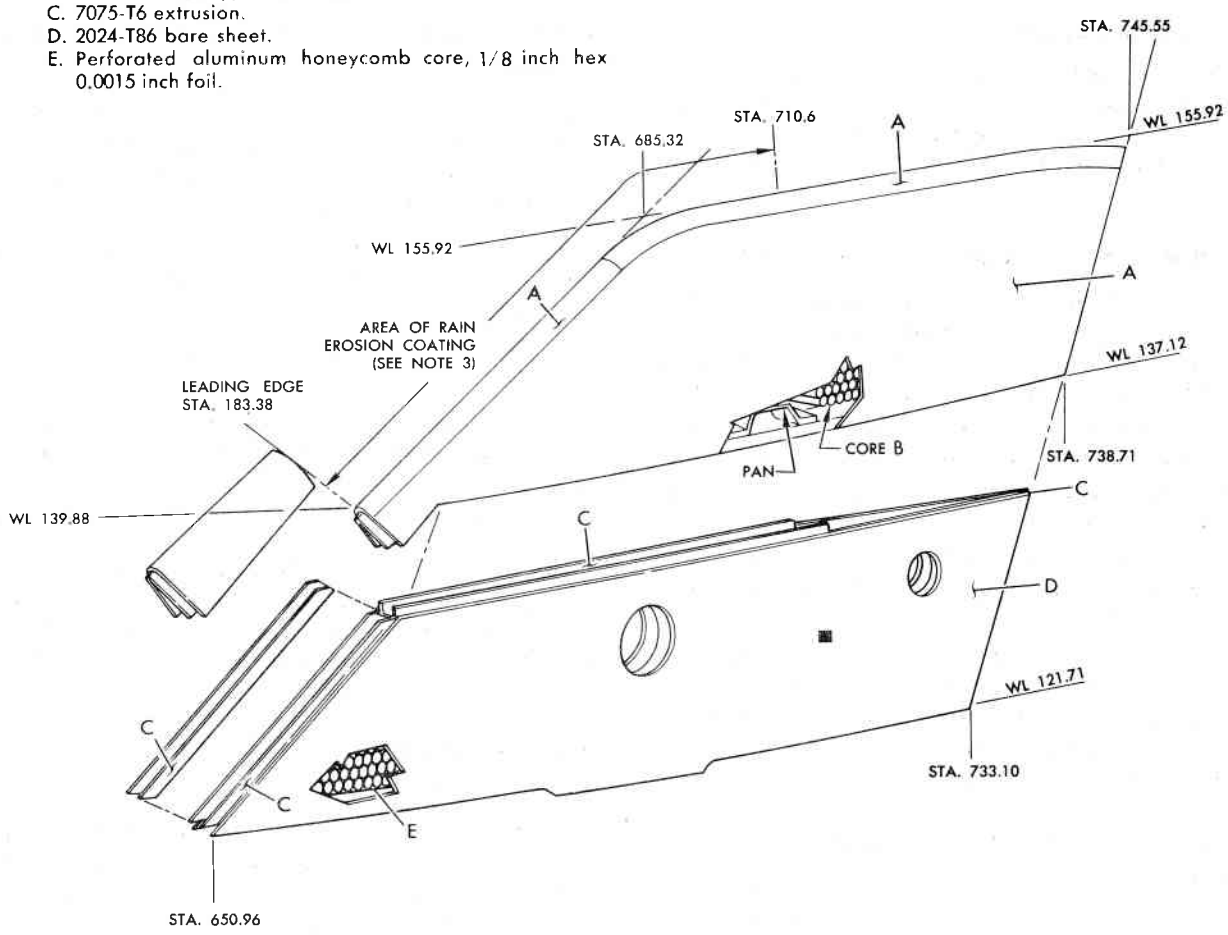
Figure 3-5. Fin Leading Edge Structure

MATERIAL

UNLESS OTHERWISE NOTED ALL PARTS ARE MADE FROM 7075-T6 BARE SHEET.

A. Laminated fiberglas skin, made in accordance with Specification MIL-P-8013A, Type III, of 181 glass cloth conforming to Specification MIL-F-9084, Type VIII and Selectron 5016 resin conforming to Specification MIL-R-7575, Type III.
B. Phenolic honeycomb core, 3/16 inch hex. Specification MIL-C-8073A, Type I-B, Class I.
C. 7075-T6 extrusion.
D. 2024-T86 bare sheet.
E. Perforated aluminum honeycomb core, 1/8 inch hex 0.0015 inch foil.

SYMBOL	GAGE
■	0.051



NOTES:
1. REFER TO PARAGRAPH ON "REPAIRS" IN THIS SECTION FOR REPAIR INFORMATION.
2. REFER TO PARAGRAPH ON "NEGLIGIBLE DAMAGE LIMITS, TAIL GROUP" IN THIS SECTION FOR DISPOSITION OF NEGLIGIBLE DAMAGE TO THIS COMPONENT.
3. REFER TO SECTION I FOR REPAIRS TO RAIN EROSION COATING.

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Figure 3-6. Fin Tip Plating and Structure

structures, leading edge plating structures, and fin tip plating and structures. These components are also located as to area on figure 3-1.

3-13. REPAIRS.

3-14. The repairs to the tail group components are unique because of high stress level on the components and the installation of radio gear in certain portions. Consequently, before attempting a repair on any tail group component, carefully read the information concerning the repair of the particular component.

3-15. Rivet Substitution.

3-16. All rivets used in the vertical fin of F-106 airplanes may be substituted with different types of rivets which have either the same or a greater strength value than the original rivet. Refer to Table 1-XXII for rivet substitution data.

3-17. Negligible Damage Limits—Tail Group.

3-18. Table 3-I indicates the maximum allowable classification of five types of negligible damage (damage allowed to remain "as is" after minor rework such as stop drilling cracks, and fairing nicks or scratches). The maximum allowable damage classification will be found to the right of the component name in the vertical column under "Type of Damage." After classification is determined, see figures 1-17 through 1-19 for the damage limits allowed for each class: I, II, or III. The limits given on figures 1-17 through 1-19 apply only for a damaged area after rework, as shown on figures 1-20 and 1-21. An aeronautical structures engineer must be consulted for damages exceeding the limits given on figures 1-17 through 1-19 and for damage to components not listed in this table. Refer to paragraph 3-23 for negligible damage limits for upper fin tip.

3-19. Repairs to Fin Interspar Structure.

3-20. Unless otherwise approved by an aeronautical structures engineer, all repairs to the fin outer surface must be of the flush-type. See figures 3-6, 1-28, and 10-6 for various types of applicable repairs. See figures 3-14, 3-15, and 10-14 through 10-46 for repairs to the honeycomb sandwich panels. Repairs to fin aft spar hinge lug are shown on figure 3-7 and repairs to fin ribs are shown on figure 3-8.

3-21. Fin Leading Edge Repairs.

3-22. Unless otherwise approved by an aeronautical structures engineer, all repairs to the fin leading edge plating must be of the flush-type. See figures 1-25 and 3-9 for details concerning repairs. See figures 10-1 and 10-6 for typical repairs applicable to these components. Refer to paragraph 3-17 for the prescribed limits of negligible damage.

3-23. Fin Tip Repairs — Negligible Damage Limitations, Upper Section.

3-24. Minor scratches and abrasions in fiberglass laminate skin may be considered as negligible and allowed to remain "as is" where the following limitations are not exceeded:

a. Depth of damage: 0.010-inch maximum, provided the underlying glass fibers are not exposed.

b. Location of damage: Within area not covered by rain-erosion coating.

3-25. Fin Tip Repairs — Advanced Base Repairs to Upper Section.

3-26. Minor surface repairs are recommended for scratches and abrasions in the fiberglass laminate skin which cannot be considered as negligible and do not exceed the following limitations:

a. Depth of damage: 0.030-inch maximum, provided no more than three layers of the underlying glass cloth are damaged.

b. Location of damage: Nonrestricted areas shown on figure 3-13.

c. Total area of repair: Six square inches after repair is completed. Refer to paragraph 3-27 for information concerning major damage, if the damage exceeds the above limits. The procedures for the removal and replacement of the rain-erosion coating are given in paragraph 1-197. Minor surface repairs shall consist of filling in the damaged area with a mixture of catalyzed resin and chopped glass fibers, or the laying-in of several layers of catalyzed resin-impregnated glass cloth as specified in paragraph 1-199.

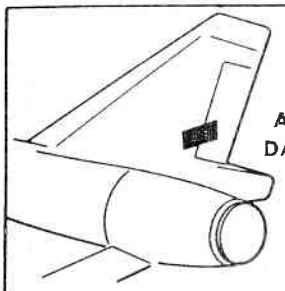
3-27. Fin Tip Repairs — Depot Repairs to Upper Section.

3-28. All damage to the fin tip upper section which exceeds the negligible damage or advanced base repair limitations shall be considered as major damage and shall be corrected at depot level. Types of major damage are as follows:

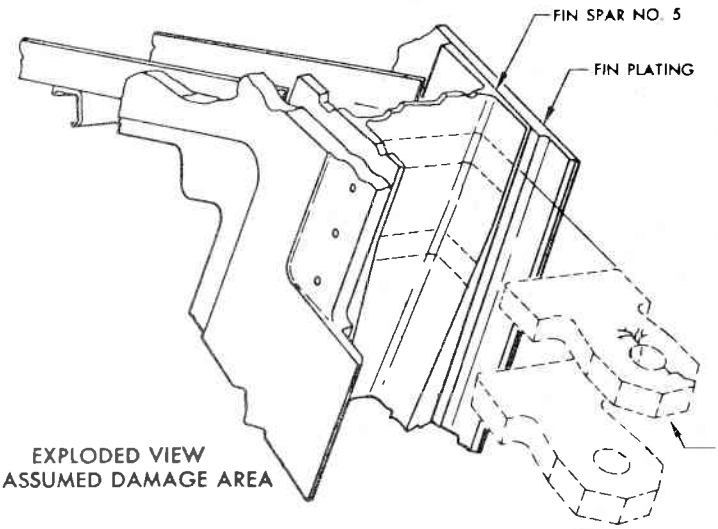
a. Deep scratches, abrasions, or dents.

b. Cracks or holes through laminate skin.

c. Delamination, which may be defined as a breaking down of the bond between the laminate and the core or between the individual layers of the glass cloth in the laminate. Delamination may be detected by lightly rapping with the edge of a coin on the suspected spot and surrounding areas. Listen for a definite change in sound over the affected area. Bulges in the surface will also indicate delamination areas. Request assistance from the nearest prime AMA for review and disposition of major damage by qualified aeronautical structures and antenna engineers. See figure 3-13 for areas that are restricted to the following types of repair:



AREA OF ASSUMED DAMAGE—WL 65.30



EXPLODED VIEW OF ASSUMED DAMAGE AREA

REPLACEMENT OF FIN AFT SPAR HINGE NODE

a. Remove the rudder from the airplane. Refer to T.O. 1F-106A-2-7-2-1 for rudder removal procedure.

b. Using a metal saw, remove as much of the damaged hinge node as possible.

c. File the remaining portions of the hinge node not removed by sawing, until the hinge surfaces are flush with the spar. Using emery cloth, remove all file marks from the spar. Refer to Section I for paint and primer procedures.

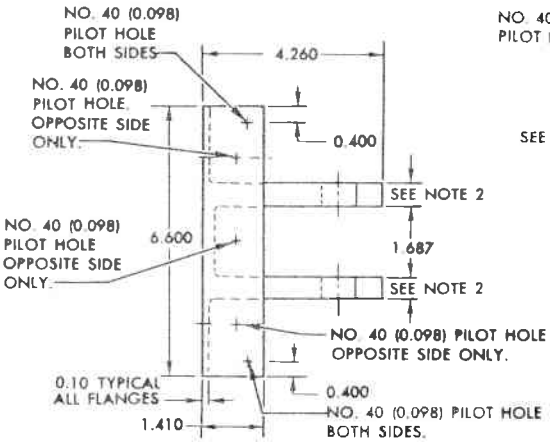
d. Fabricate a new hinge node from a piece of 3.50x3.50x5.00-inch 2014-F bar. Outside dimensions of new hinge node will vary according to the amount of material removed from the spar and the natural taper of the spar.

e. Drill 12 No. 40 (0.098) pilot holes and two No. 30 (0.128) pilot holes, as shown in Detail A.

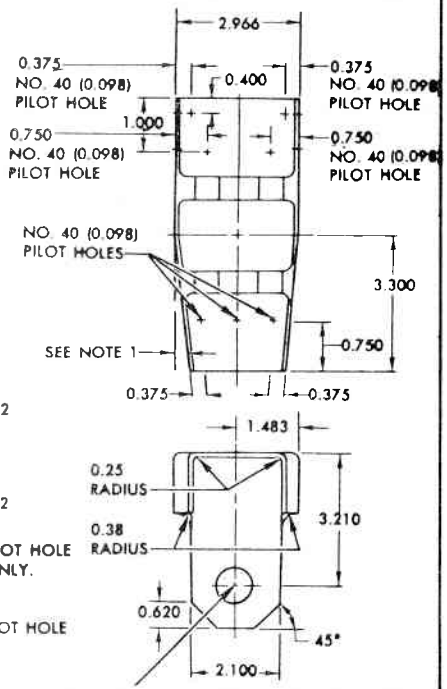
f. Position and align the new hinge node in the area provided in steps B and C. Secure the new hinge node in place with clamps. See figure Master Tooling—Vertical Fin for correct position of hinge node.

g. Using the seven No. 40 (0.098) pilot holes shown in the front view of detail A as a guide, drill seven No. 15 (0.180) holes. Ream holes from 0.199 to 0.202 and install seven F-200-2 Jo-bolts.

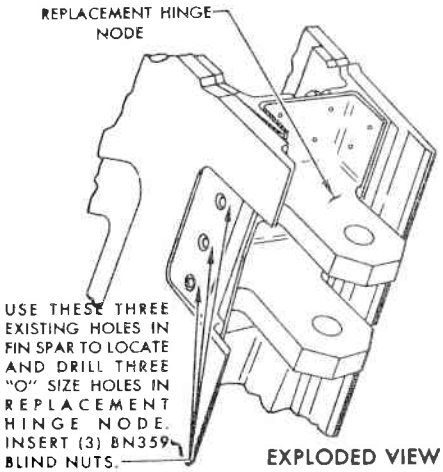
CAUTION
USE EXTREME CARE TO AVOID CUTTING INTO THE SPAR FLANGES.



DETAIL A



PRE-DRILL (UPPER, CENTER AND LOWER HINGE NODES) WITH NO. 30 (0.128) DRILL. FINISH DRILL CENTER AND LOWER NODES WITH 13/16 INCH DIAMETER DRILL; FINISH REAM TO 0.8750 (±0.0005) INCH. FINISH DRILL UPPER HINGE NODES WITH 3/4-INCH DIAMETER DRILL; FINISH REAM TO 0.8125 (±0.0005) INCH (REFERENCE DRAWING 8-14795).



EXPLODED VIEW OF REPLACEMENT PART AFTER INSTALLATION

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h. Using the five No. 40 (0.098) pilot holes shown in the side view of Detail A as a guide, drill five No. 15 (0.180) holes. Ream holes from 0.199 to 0.202 and install five F-200-5 Jo-Bolts.

i. Using the three existing holes in the fin plating and fin spar, drill "O" (0.316) size holes (3) in the replacement hinge node and insert three BN359 blind nuts.

j. Using the two No. 30 (0.128) pilot holes as a guide, drill and ream rudder pin holes to the dimensions shown in Detail A.

k. Reinstall the rudder according to procedures outlined in T.O. 1F-106A-2-7-2-1.

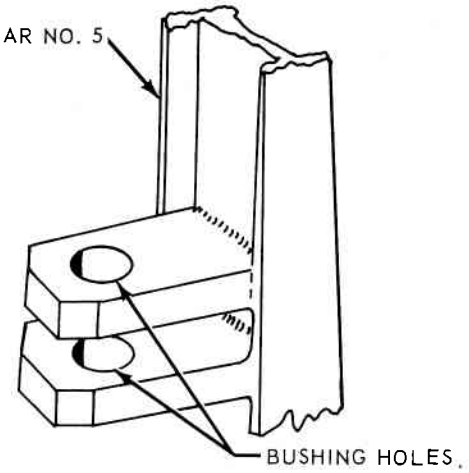
NOTES

1. REPLACEMENT OF DAMAGED HINGE NODE AT WATER LINE 65.30 WILL REQUIRE A TAPERED REPLACEMENT PART. ALL OTHER HINGE NODES WILL NOT REQUIRE A TAPERED REPLACEMENT PART.
2. UPPER HINGE NODES 0.350, CENTER AND LOWER HINGE NODES 0.500 (REFERENCE DRAWING 8-14795).

Figure 3-7. Fin Aft Spar Hinge Lug (Nodes) Repair and Replacement (Sheet 1 of 2)

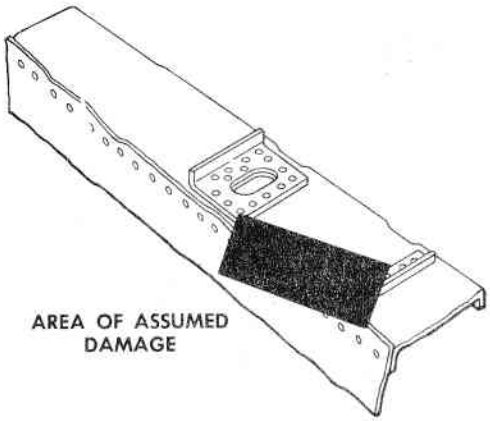
REPAIR OF FIN AFT SPAR HINGE NODE BUSHING RETAINER HOLES

a. When bushing holes are oversize or galled, clean up damaged hole by reaming until damage is removed. The diameter of the bushing hole shall not be increased beyond 1.010 inch.
b. Repair hinge nodes in accordance with Figure 3-7 (Sheet 1 of 2) if the above limit is exceeded.
c. Manufacture repair bushings (one piece) in accordance with drawings 8-15805 (upper hinge nodes) and 8-15810 (center and lower hinge nodes) with the exception of increasing the O.D. diameter as required to maintain an interference fit of 0.0005 to 0.0015 inch.
d. Install bushing in accordance with T.O. 1F-106A-2-7-2-1.



EXPLODED VIEW
OF DAMAGED HOLES

Figure 3–7. Fin Aft Spar Hinge Lug (Nodes) Repair and Replacement (Sheet 2 of 2)



A Drill out existing 3/16 inch diameter rivets indicated by (O), attaching skin, doubler, and stiffener using a No. 11 (0.191) drill. Drill out rivets attaching skin four places beyond damaged area.

B Clean up damaged area to regular shape. Break all sharp edges and round all corners to 0.125 radius.

C Fabricate doubler of same type material and gage as rib assembly web. Drill No. 11 (0.191) rivet holes (19) to match existing rivet holes indicated by (O) and new rivet holes (40) as indicated by (−).

D Replace stiffener. Drill No. 11 (0.191) rivet holes indicated by (−) to match existing rivet holes indicated by (O) on doubler.

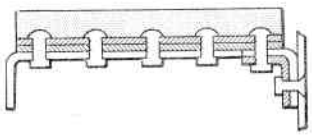
E Fabricate filler angle of same type material and gage as rib. Drill No. 11 (0.191) holes (20). Pick up rivet pattern from existing holes on doubler and rib.

F Fabricate splice angle of same type material and gage as rib. Drill No. 11 (0.191) holes (36). Pick up rivet pattern from existing holes on doubler, rib, and angle.

G Install doubler, stiffener, filler angle, and splice angle with AN470DD6 rivets.

H Attach skin with AN426DD6 flush head rivets (18) through filler angle and splice angle.

I Skin omitted for clarity. See Section A-A. If skin requires replacement, machine countersink rivet holes 100° x 0.365.



SECTION A-A

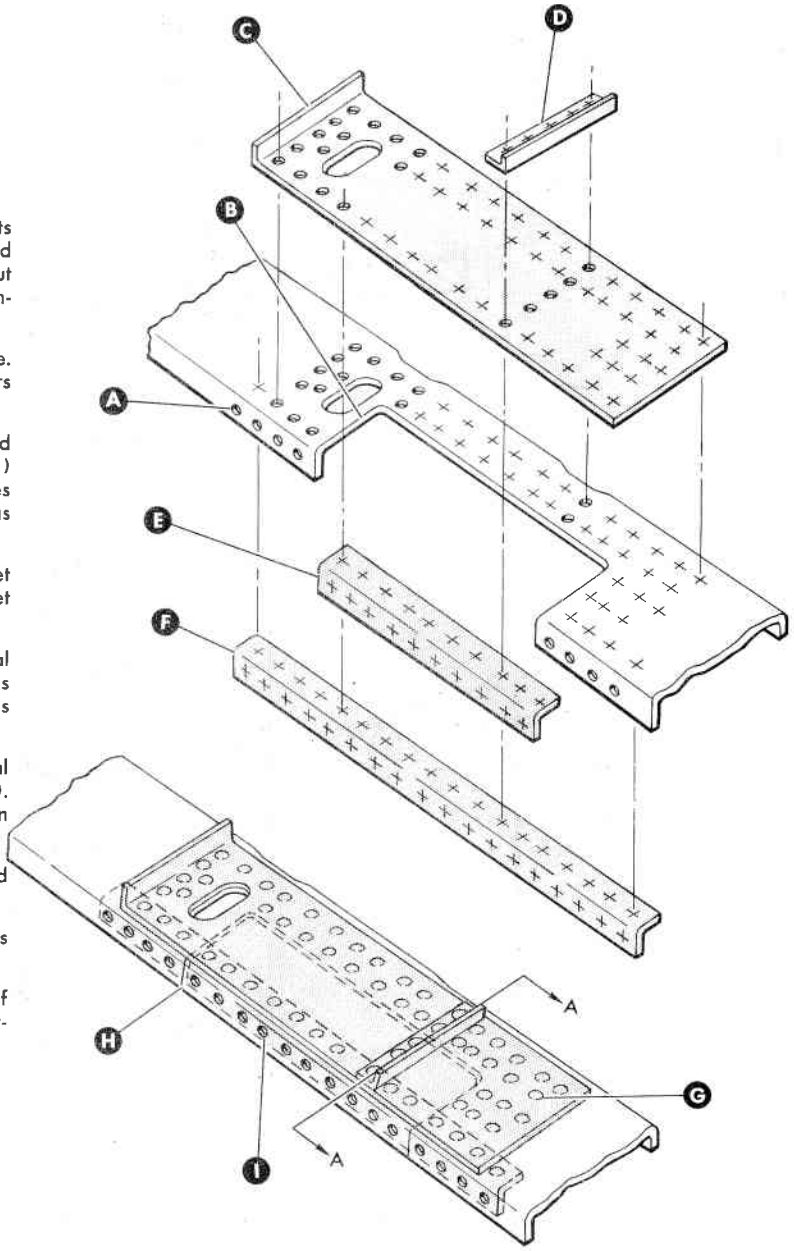


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Figure 3-8. Fin Rib Repair

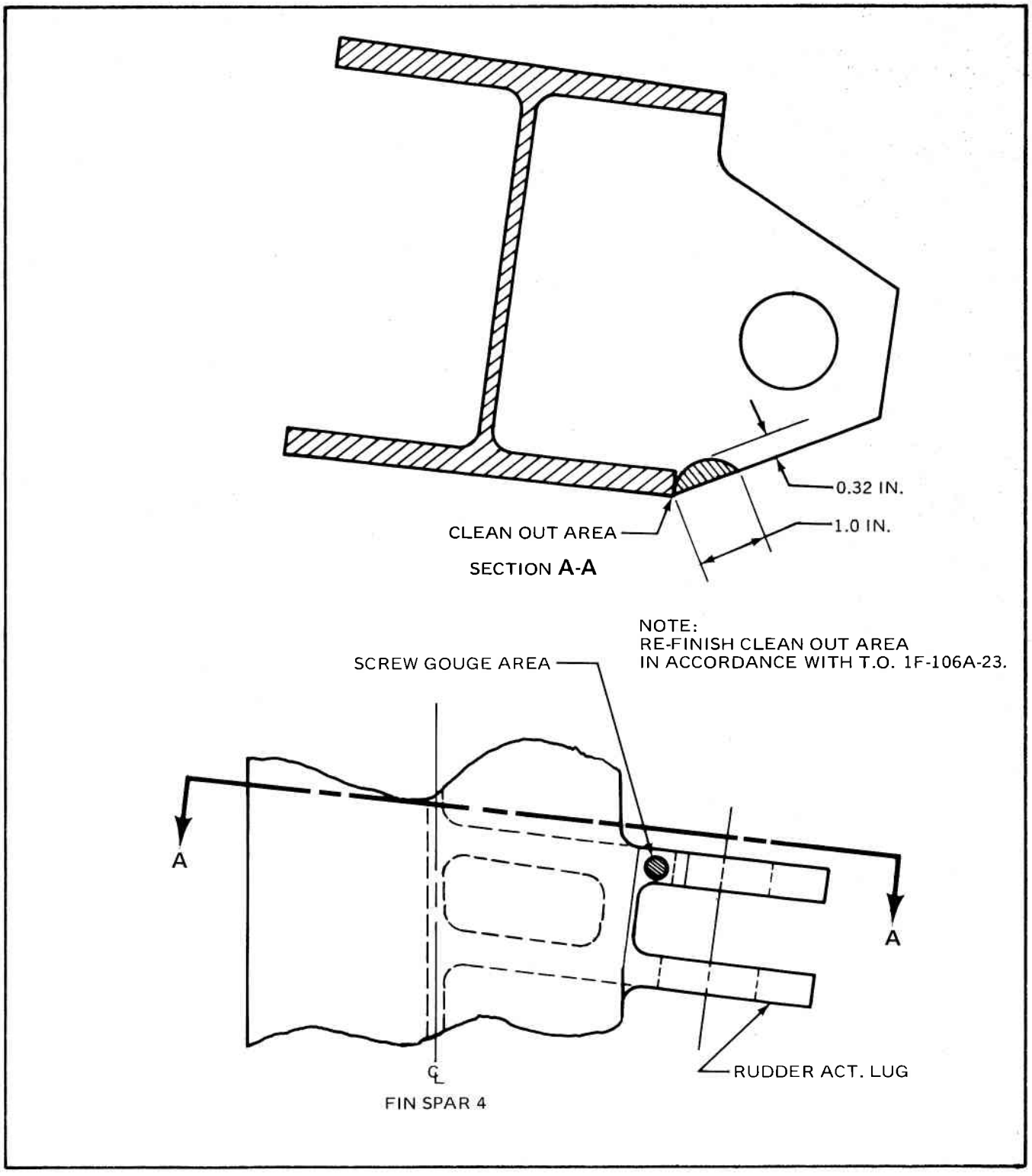
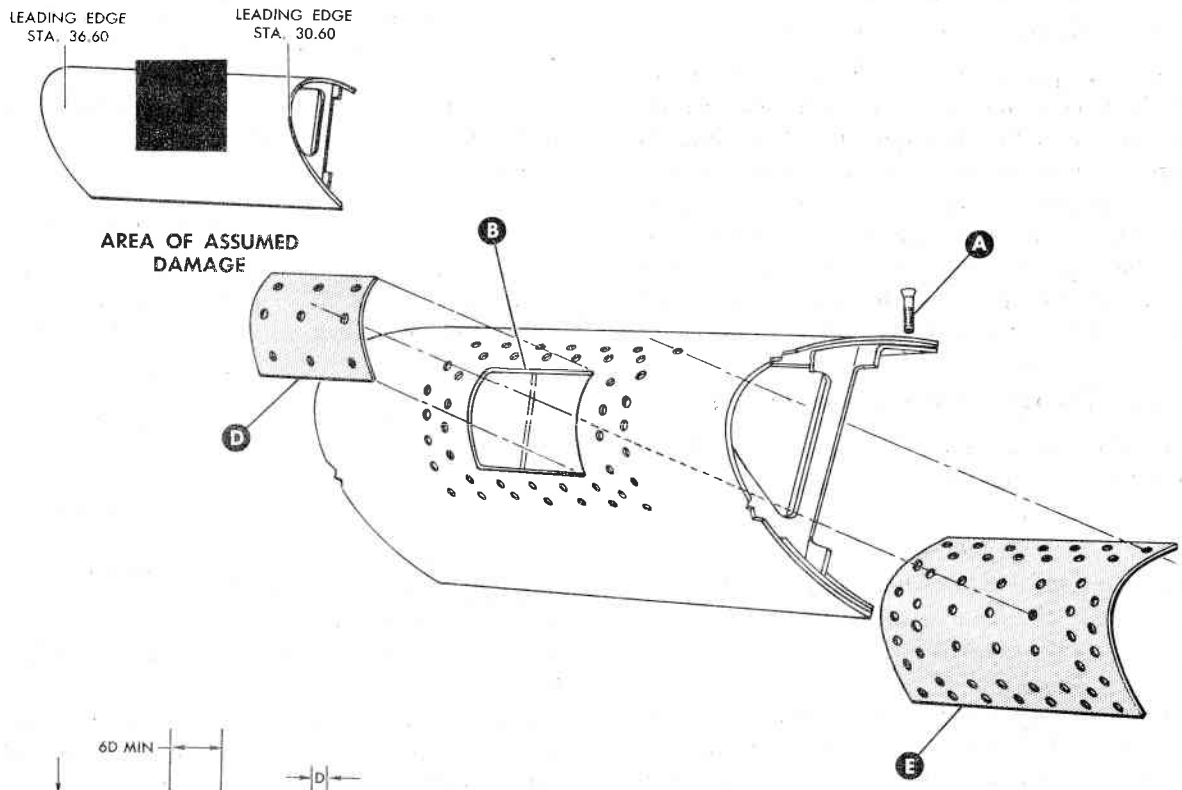
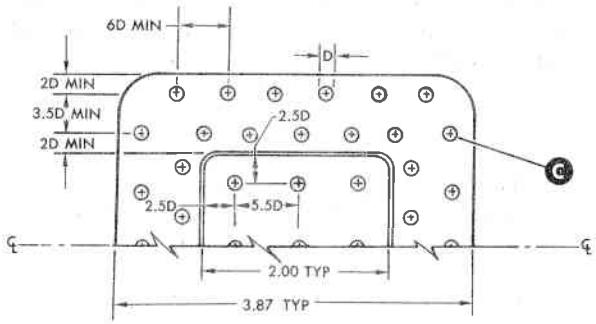
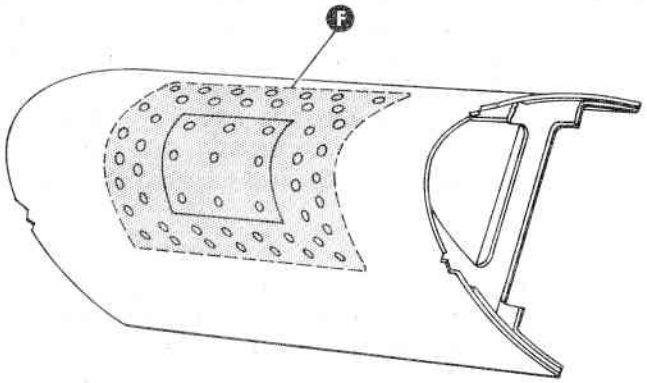


Figure 3-8A. Fin Spar 5 Repair







(A) Remove NAS333 screws attaching fin leading edge containing damaged area. Remove fin section.

(B) Clean up damaged area to regular shape. Break all sharp edges and round all corners to a 0.125 radius.

(C) Layout and drill No. 30 (0.128) rivet holes (53) as shown. Machine countersink rivet holes 100° x 0.297.

(D) Fabricate patch plate from 0.051 gage, type 7075-T6 bare material.

(E) Fabricate doubler of 0.064 gage, type *7075-T6 bare material.

(F) Install patch plate and doubler with AN426-AD5 flush head rivets (53).

*IF NECESSARY, FABRICATE PART FROM 7075-0, SHAPE TO FIT CONTOUR, AND HEAT TREAT TO 7075-T6 CONDITION PER SPECIFICATION MIL-H-6088 TO PREVENT CRACKS.

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Figure 3-9. Fin Leading Edge Repair

a. Upper fin tip repair – leading edge.

b. Upper fin tip repair – step joint method.

c. Upper fin tip repair – scarf joint method.

If damage to the upper fin tip extends through both face plies and the honeycomb core, repair one side first and allow to cure, then repair the opposite side making the second repair at least two inches larger in diameter than the first. If the types of repair resin mentioned in the repair procedures are not available, any polyester resin that meets the requirements of Specification MIL-R-7575, type III, may be used provided that the manufacturer's mixing and curing instructions are strictly followed.

3-29. Upper Fin Tip Repair — Leading Edge.

3-30. The following procedure is to be used with figure 3-10, for repair of the fin tip leading edge:

NOTE

Information will be furnished when available concerning combination repair of leading edge and honeycomb core of upper fin tip.

a. Remove rain erosion coating six inches on each side of damaged area. Refer to paragraph 1-197 for removal procedure for rain erosion coating. If the damage occurs in that portion of the leading edge not covered with rain erosion coating, omit this step and proceed with step "b."

b. Cut or rout out the damaged area to a regular shape.

CAUTION

Do not cut or rout into the honeycomb core area in excess of one-half inch in depth.

c. Using a vacuum cleaner or compressed air, thoroughly remove all loose particles from the damaged area.

WARNING

If compressed air is used for removing loose particles, a face shield shall be worn by the operator to protect against flying particles.

d. Using an undamaged fin tip as a guide, prepare a mold at least four inches longer than the length of damage (two inches overlap at each end) to simulate the contour of the damaged area.

e. Using sheet wax, build up the inside of the mold approximately 0.080 inch to simulate the thickness of the fin tip leading edge laminate.

NOTE

Sheet wax may be obtained in varying thicknesses from the Kindt-Collins Company, 12651 Elmwood Ave., Cleveland, Ohio.

f. Insert one layer of No. 181 glass cloth, Specification MIL-F-9084, into the mold; impregnate with catalyzed resin and allow to cure.

REPAIR RESIN AND CATALYST

100 parts of resin Epon 815 or 828 Shell Chemical Corp.	and	25 parts of catalyst curing agent "T-I" Shell Chemical Corp.

or as an alternate use:

100 parts of resin Epon 828 Shell Chemical Corp.	and	10 parts maximum of curing agent "Hardener 951" Furane Plastics Inc.

g. Prepare the damaged fin tip leading edge for repair by scarfing the edges of the undamaged fiberglass laminate. Edges should be scarfed back at least one inch to provide sufficient bonding area for the fiberglass repair plies.

h. Remove the cured layer of fiberglass from the mold; cut to fit into the damaged area; clean thoroughly with methyl ethyl ketone, Specification TT-M-261, and allow to dry.

NOTE

The cured ply of fiberglass should be cut to length so as to butt up against but not overlap the innermost layer of laminate.

i. Cut nine additional layers of No. 181 fiberglass cloth. Each layer of fiberglass should be cut to sufficient size so that it will overlap the preceding layer by a proportionate amount. Proportionate amount of overlap will be determined by length of scarf. For instance, if the edge of the leading edge laminate has been scarfed back one and one-half inches and nine layers of cloth are to be applied, the overlap will be determined by the following formula: 1.50 inches divided by 9 equals 0.166 inches, which equals total overlap. 0.166 inches divided by 2 equals 0.083 inches, which equals overlap at each end.

j. Mix up enough resin with proper catalyst to impregnate the entire nine layers of repair plies. To mix the proper amount of resin, weight of base resin should equal the dry weight of fiberglass repair plies.

k. Apply a thin brush coat of catalyzed resin to the exposed surface of pre-cured repair ply and to the scarfed area.

l. Apply the first repair ply of fiberglass (first ply will be the smallest piece) and thoroughly impregnate the pores of repair ply with catalyzed resin.

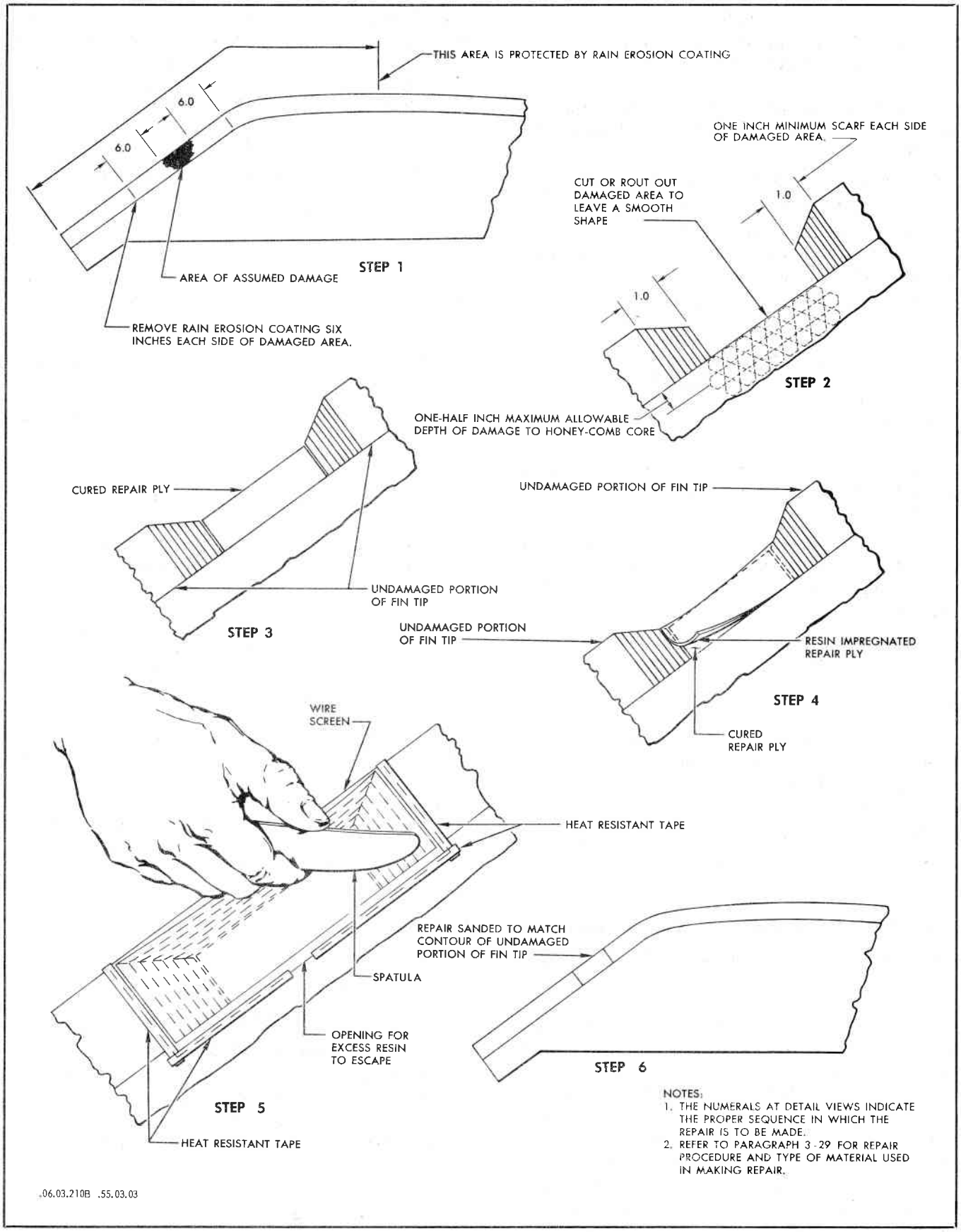


Figure 3-10. Upper Fin Tip Leading Edge Repair

NOTE

A nylon bristle brush will provide good results in applying resin to fiberglass cloth.

m. Apply the next larger repair ply and repeat resin application. Follow this method until all repair plies are in place.

n. Form a piece of fine wire screen over the repair area, and hold in place with heat resistant tape.

o. Using a spatula or similar flat object, wipe out the excess resin. The working or wiping of the laminate will be stopped when all air bubbles have been removed and the patch plies are firmly packed together.

CAUTION

Excessive working or wiping will cause voids and/or dry spots in the laminate.

p. Wipe up the excess resin from around the repair area with a lint free cloth moistened with methyl ethyl ketone.

q. Remove heat resistant tape and wire screen and allow repair to cure from one and one-half to two hours at room temperature, or from 25 to 35 minutes at 300°F (148.90C).

r. Using 180-grit sandpaper, sand repair area to a smooth contour with the rest of the fin tip.

s. Clean the fin tip with a cloth moistened with methyl ethyl ketone and allow to dry thoroughly.

t. Mix a small amount of base resin with catalyst and apply a thin finish coat to the repair area. Finish coat should overlap onto the undamaged portion of the fin tip on all sides a minimum of one-half inch.

u. If the damage occurred in the area protected by rain erosion coating, replace the rain erosion coating as outlined in paragraph 1-197.

3-31. Upper Fin Tip Repair — Step Joint Method.

3-32. Removal of Damaged Face Plies — Step Joint Method.

3-33. The step joint method of repair is recommended for those repairs which are larger than four square inches and extend either into the honeycomb core or completely through the core and both face plies. The following procedure may be used as a guide for the step joint type of repair. See figure 3-13 for areas restricted to this type of repair and figure 3-11 for an illustration of this method.

a. Outline the damaged area, with the aid of a straight edge and scribe, by scribing a rectangle or square with rounded corners that will require a minimum removal of sound material.

b. Extend the sides of the rectangle or square a distance in inches equal to the number of plies to be removed, less one inch, from the edge of the damaged area (seven inches if eight plies are to be removed, etc.). Overlap of each step should be at least one inch.

NOTE

In case of core damage, allow a minimum of one-half inch between the edge of the innermost ply and the perimeter of the core material that is to be removed.

c. With the aid of a straight edge, use a sharp knife or other especially prepared cutter and cut out a square area in the center of the damaged area approximately two square inches in area.

d. Remove the plug cut from the center of the damaged area.

e. With the aid of a straight edge, cut along the lines that were scribed in step "b."

CAUTION

Use extreme care not to cut or score the underlying ply of glass cloth. A suggested method is to cut half-way through the overlying ply and then lift this ply using a sharp thin chisel, as shown on figure 3-10 so that it will break away cleanly. If the layer of glass cloth underneath is cut or scored, the strength of the repair will be lessened.

f. When the outermost ply is removed, scribe a similar outline on the next exposed ply, except reduce the original dimensions one inch in all directions. Remove this ply as described previously and continue this procedure until all the damaged plies have been removed.

3-34. Replacement of Face Plies — Step Joint Method.

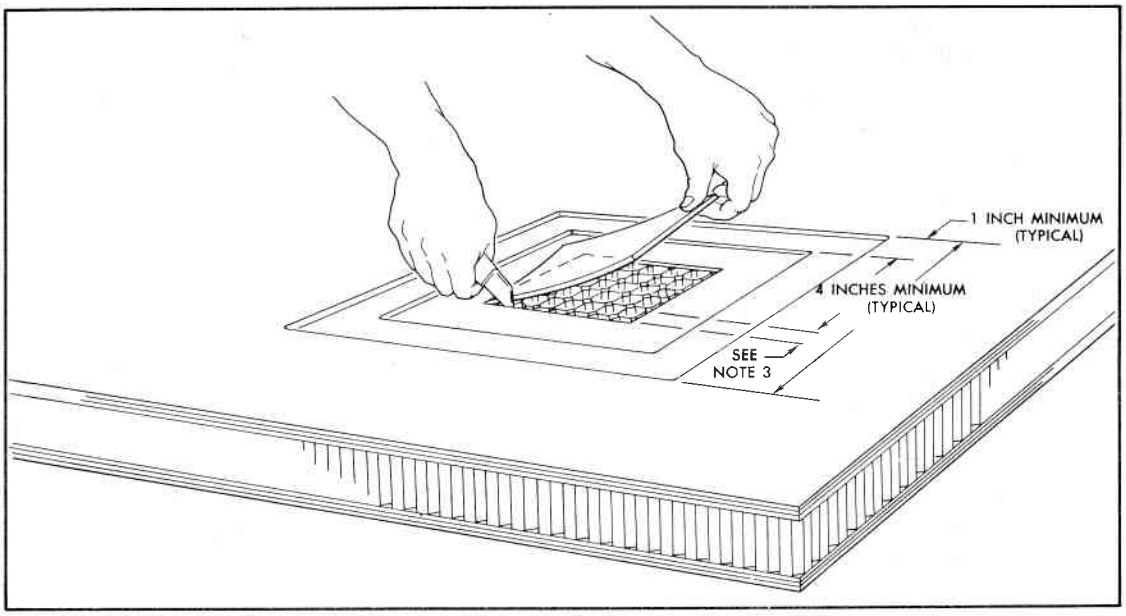
3-35. The following procedure may be used as a guide for replacing face plies in the step joint method:

a. Lightly sand exposed plies using 180-grit sandpaper.

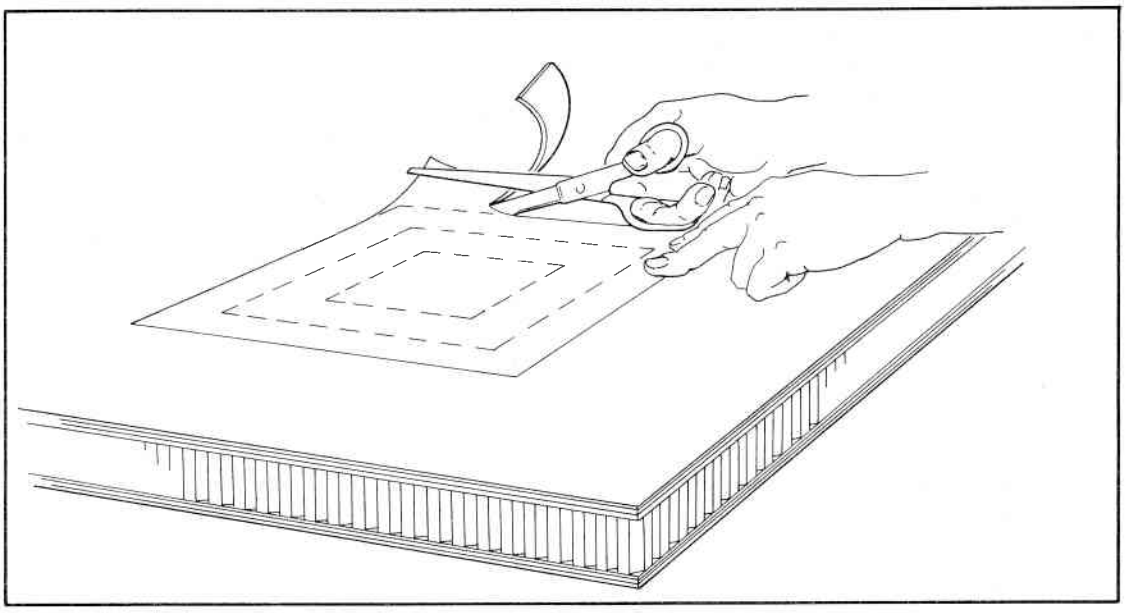
WARNING

The sanding operation on laminated glass cloth gives off a fine dust that may cause skin irritations, and breathing an excessive amount of this dust may be injurious. Therefore, precautions as to skin and respiration protection must be observed.

b. Replace face plies as shown on figure 3-10 by cutting patches from resin impregnated glass cloth (cloth



REMOVAL OF DAMAGED FACE PLIES (SEE NOTE 1)



REPLACEMENT OF REPAIR PLIES (SEE NOTE 2)

NOTES:
1. REFER TO PARAGRAPH 3-32 FOR PROCEDURE ON REMOVING DAMAGED FACE PLIES BY THE STEP JOINT METHOD OF REPAIR.
2. REFER TO PARAGRAPH 3-34 FOR PROCEDURE ON REPLACING FACE PLIES BY THE STEP JOINT METHOD OF REPAIR.
3. IN CASES OF CORE DAMAGE, ALLOW A MINIMUM OF ONE-HALF INCH BETWEEN THE EDGE OF THE INNERMOST PLY AND THE PERIMETER OF THE CORE MATERIAL TO BE REMOVED.

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Figure 3-11. Fiberglass Repair — Step Joint Method

conforming to Specification MIL-F-9084, with finishes as outlined in Specification MIL-F-9118), to conform to the first or innermost outline of exposed cutout plies and butting up to existing layers of plies but not overlapping. The impregnated glass cloth should contain 45 to 50 percent of catalyzed resin:

100 parts of resin Epon 815 or 828 Shell Chemical Corp.	and	25 parts of catalyst curing agent "T-1" Shell Chemical Corp.
	or	
100 parts of resin Epon 828 Shell Chemical Corp.	and	10 parts maximum of catalyst curing agent "Hardener 951" Furane Plastics Inc.

(Weight of resin to be equal to weight of dry glass cloth.)

NOTE

If the damage extends to the honeycomb core, the innermost layer of cloth should be cured before placing in damaged area in order to make a void-free repair to the laminate.

c. Lightly sand the cured repair ply surfaces and clean thoroughly as outlined in step "a."

d. Brush a thin coat of catalyzed resin on the surface of the cured ply that will bond to the honeycomb core, then brush a thin coat of catalyzed resin on the contact edges of the honeycomb core.

e. Place the cured ply in place and allow to cure from one and one-half to two hours at room temperature, or from 25 to 35 minutes at 300°F (148.9°C).

f. Cut the remaining patch face plies to fit the remaining steps.

NOTE

A recommended method for cutting resin impregnated glass cloth is to sandwich each piece between two sheets of colored cellophane larger than the patch by at least two inches for all sides. The patch plies are then cut to desired shape without the usual fraying of the edges. Remove cellophane sheets as patch plies are applied.

g. Cut from polyvinyl alcohol sheeting (PVA) a sheet or cover conforming to the shape of the repair area and extending at least two inches beyond the edge of the repair.

h. Place the PVA sheeting over the wet laminate; then using heat resistant tape or zinc chromate paste, seal the edges of the PVA sheeting except for a small opening at one edge.

i. Using a spatula or similar flat object, wipe out the excess resin and all air bubbles toward the opening left in the sheeting. The working or wiping of the laminate will be stopped when all air bubbles have been removed and the patch plies are firmly packed together.

CAUTION

Excessive working or wiping will cause voids and/or dry spots in the laminate.

j. When the repaired laminate has been cured, one and one-half to two hours at room temperature or 25 to 30 minutes at 300°F (148.90C), lightly sand, if necessary, to obtain smoothness and contour, to remove excess resin and to prepare surface for any subsequent painting or coating. Use 180-grit sandpaper and observe skin and respiration precautions as previously noted.

k. Mix a small portion of catalyzed resin and brush on a thin finish coating of clean resin. Allow finish coat to cure 8 to 24 hours before subjecting fin tip to use.

3-36. Upper Fin Tip Repair — Scarf Joint Method.

3-37. Removal of Damaged Face Plies — Scarf Joint Method.

3-38. This type of repair is not recommended for damage in excess of four square inches and extending into the honeycomb core. The following procedure may be used as a guide for the scarf method of repair:

a. Sand out the damaged face plies to a circular or oval dish shape using 180-grit sandpaper, as shown on figure 3-10.

b. The damaged face plies shall be scarfed back a minimum of fifty times the face ply or wall thickness from the outer edge of the damaged area. For instance, if wall thickness equals 0.045 inch, scarf back 50 times 0.045 inch, or 2-250 inches.

3-39. Replacement of Face Plies — Scarf Joint Method.

3-40. The following procedure may be used as a guide for replacing patch plies in the scarf type repair:

a. Thoroughly clean the damaged area with methyl ethyl ketone, Specification TT-M-261. Allow to dry completely before proceeding with repair.

b. The glass cloth laminations for the scarf type repair are prepared with the largest piece being cut to the exact shape of the outside of the scarfed area, and the smallest piece being cut so that it overlaps the scarfed area by its proportionate amount (proportionate amount of overlap will depend upon the number of plies being replaced). The intermediate pieces are cut to have equal taper. See figure 3-12 for an illustration of this method.

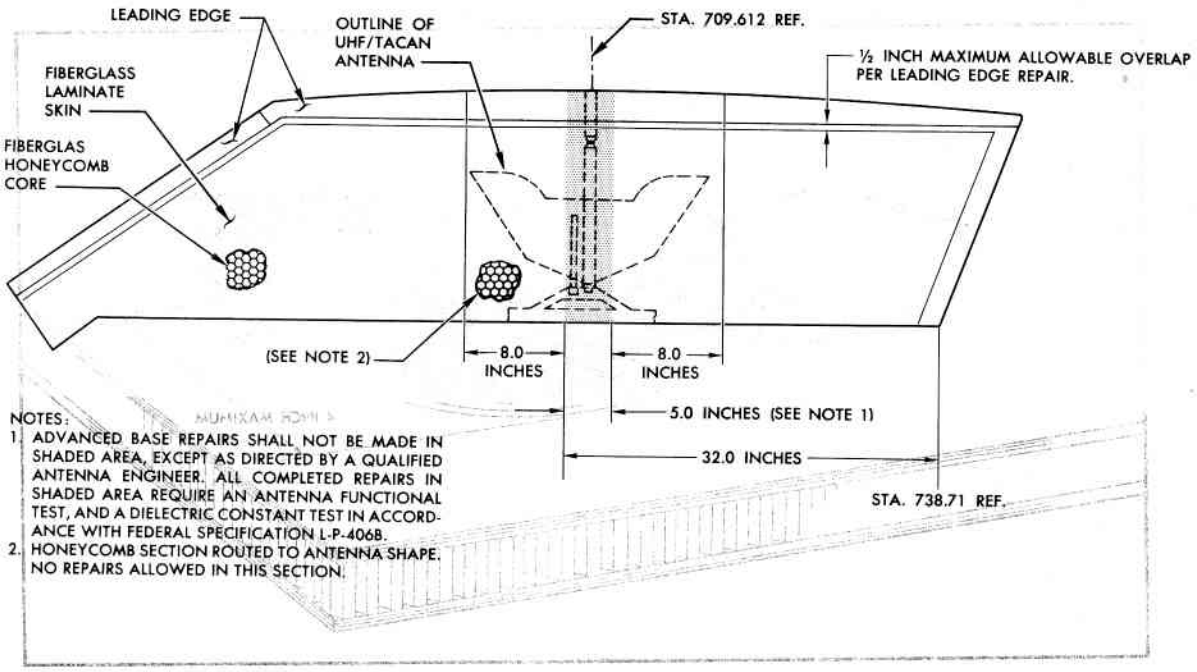


Figure 3-13. Repair Limitations — Upper Fin Tip Fiberglass Laminate

NOTE

A convenient method of preparing the glass cloth patches is to impregnate the repair patches with catalyzed resin in any convenient method. Use the same type and mixture of resin as used in the step joint type of repair. Sandwich repair patches between two sheets of colored cellophane larger than the repair patch by at least two inches on all sides. The patch pieces are then cut to desired shape without the usual fraying at the edges.

c. Coat the scarfed surface of the repair area with one brush coat of catalyzed resin before applying patches.

d. When all the patch plies are ready for assembly, place them in the proper sequence for installation with the smallest piece first. Remove the first sheet of cellophane and insert the patch in place, then remove the second sheet of cellophane.

e. Complete the buildup, cure and finish as outlined in paragraph 3-34.

3-41. Replacement of Damaged Honeycomb Core.

3-42. When making repairs to the honeycomb core, do not remove both sides of laminated face plies at the same time. Remove one surface of face plies by either the step joint or scarf method, depending upon the extent of damage, then repair honeycomb core by the following procedure:

a. Cut out damaged core and lightly sand the exposed surface of the inner ply of cloth.

b. Thoroughly clean the damaged area with methyl ethyl ketone, Specification TT-M-261, and allow to dry thoroughly.

c. Cut a piece of honeycomb core material to the exact size of the damaged area. The thickness and cell size of the repair honeycomb core shall conform to Specification MIL-C-8073A.

NOTE

If slicing of the repair honeycomb core is necessary, use a band saw for convenience. The bandsaw blade should have about 32 teeth per inch and be operated at a speed of about 5000 fpm.

d. Apply a thin coat of catalyzed resin to the cutout area and a like amount on all surfaces of the replacement core, then insert core material into the damaged area making certain that replacement core conforms closely to the existing undamaged honeycomb core.

e. Insert the first impregnated patch ply over the replacement core material, then apply a light and uniform pressure by means of heat resistant tape, sand bags or vacuum bags.

f. Cure the honeycomb core repair with heat lamps, or by inserting the entire assembly in an air-circulating oven at temperatures specified in paragraph 3-34.

g. Finish face ply buildup by repeating procedures outlined in either paragraph 3-34 or 3-39.

h. Finish outside surface as outlined in paragraph 3-34.

3-43. Fin Tip Repairs to Lower Section.

3-44. See figure 1-18, and refer to typical repairs in Section X for repairs to the ribs and channels in the fin tip lower section. Refer to Section X for repairs to the honeycomb sandwich panels. Refer to Section II, Paragraph 2-77A, which uses same type procedures and materials.

3-45. Rudder Repairs.

3-46. All repairs to the rudder are considered to be of a critical nature because of the high stress level imposed on the structure. Any repairs to the spar, the skin adjacent to the rudder hinge, and to the rudder actuator will require approval by an aeronautical structures engineer. The use of external patches or the protruding of rivet heads will require the approval of an aeronautical structures engineer. Refer to Table 3-1 for the prescribed limits of negligible damage. Refer to Section X for repairs to the honeycomb structure. See figure 3-14 for rudder honeycomb separation repair. Refer to Section II, paragraph 2-77A, which uses same type procedures and materials.

3-46A. Inspection, Dehydration, Repair, and Seal Surfaces Containing Honeycomb Core Applicable to Vertical Stabilizer Fin Tip Lower Panel and Rudder will be accomplished as follows:

a. Remove vertical stabilizer fin tip lower panel and rudder in accordance with instructions contained in T.O. 1F-106A-2-2-2-2 and T.O. 1F-106A-2-7-2-1.

b. Drill out JO-Bolts, NAS1674-3L, attaching tip assembly lower panels to vertical stabilizer.

NOTE

Rudders and fin tip lower panels which have been reworked by depot, to replace the perforated core with non-perforated core do not require dehydration and sealing.

c. X-ray fin tip lower panel and rudder to determine if moisture is present and/or core is damaged.

d. Using a "Q" drill bit (0.3320-inch diameter) drill hole in center of upper rib on longitudinal centerline of vertical stabilizer fin tip lower panel. For rudder, on longitudinal centerline on bottom rib two inches aft of aft edge of support fitting.

CAUTION

Use drillstop to assure that bit does not penetrate more than 1/8 inch into honeycomb core.

e. Tap hole with 3/8 -24 tap and install union fitting AN815-3 (FSN 4730-187-0483) in tapped hole using sealant MIL-S-8802 class B.

f. Utilizing low temperature boil procedure, dehydrate assembly using set moisture removal FSN 4920-ND00062P. Vacuum shall be between 10 PSIG to 12 PSIG to assure boiling of water at as low as 160°F and temperature shall not exceed 180°F. 4 to 8 hours may be required for dehydration of core assembly, dependent on the amount of water in core.

NOTE

A vacuum chamber capable of safely maintaining 12.3 PSIG vacuum at 160°F to 180°F with adequate safety provisions to assure preventing excess temperature or collapsing from excess vacuum may be used as a suitable substitute.

g. Re-x-ray assembly to determine that all moisture has been removed.

h. When all moisture has been removed from assembly or x-ray reveals no moisture present, repair any damage in accordance with applicable procedures outlined in this technical order.

i. Test and seal all assemblies as follows:

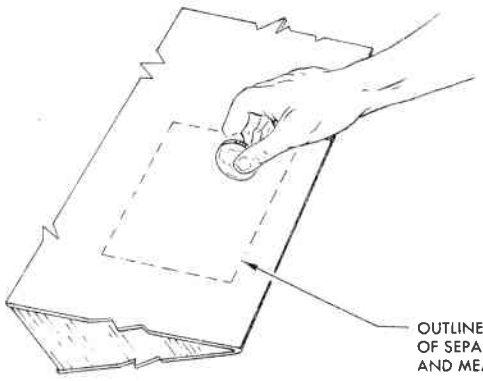
(1) Connect air line to fitting (Part No. AN815-3).

(2) Pressurize assembly between 10 to 12 PSIG with dry oil free air and submerge in water to locate leaks.

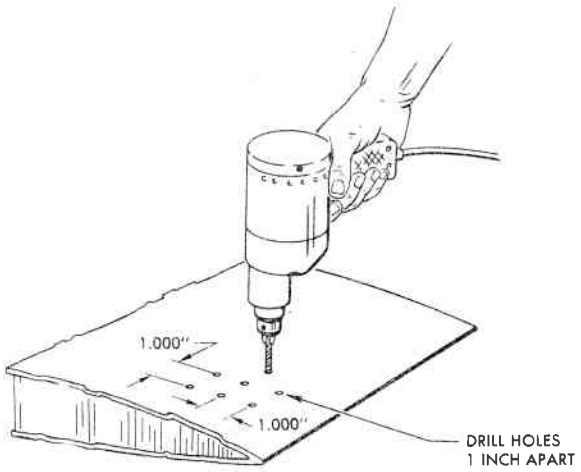
NOTE

For vertical stabilizer lower fin tip, fabricate rubber wedges to plug wave guide and IFF antenna openings when panel is to be submerged in water.

(3) Mark all leaks with black grease pencil or suitable substitute.

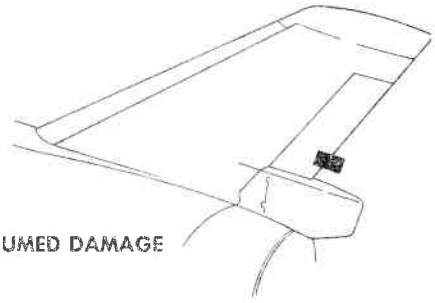


STEP 1



STEP 2

STEP 3



REPAIR PROCEDURE

a. Determine exact area of separation by rapping outer surface of rudder with a coin. **(STEP 1)**

b. Outline exact area of separation with a pencil and measure area.

■ c. Remove rudder in accordance with T.O.1F-106A-2-7-2-1.

NOTE

IF AREA OF SEPARATION EXCEEDS 6 SQUARE INCHES, REPLACE RUDDER.

d. Drill holes through skin in area where separation has occurred. Use a No. 40 (0.098") drill. Holes should be drilled one inch apart throughout area of separation. **(STEP 2)**

CAUTION

DO NOT ALLOW DRILL TO PENETRATE MORE THAN 1/16 INCH THROUGH SKIN TO PREVENT DAMAGING HONEYCOMB SEGMENTS.

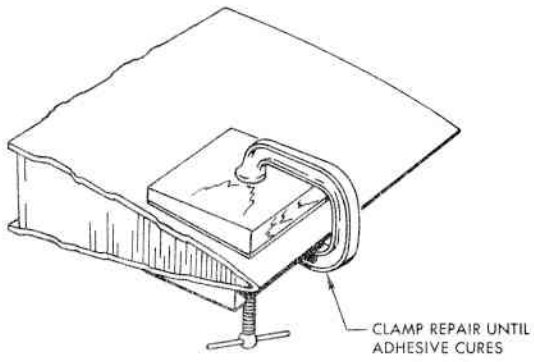
e. Mix adhesive. Refer to Table II-VIII for mixing procedure. Use one of the following adhesives: Epon VIII, Epon 3119 or EC1469.

f. Use a sealant gun with a small tip or a large type hypodermic needle and inject enough mixed adhesive to completely saturate area of separation and flush the drilled holes. **(STEP 3)**

NOTE

IF AREA OF SEPARATION IS SMALL (2 SQUARE INCHES OR LESS) ADHESIVE MAY BE INJECTED FIRST WITH ONE NEEDLE FOLLOWED BY THE ACCELERATOR IN ANOTHER NEEDLE. THIS METHOD WILL ELIMINATE PRE-MIXING. HOWEVER, PROPER MIXTURE RATIOS BETWEEN ADHESIVE AND ACCELERATOR MUST BE OBSERVED.

g. Clamp a block over repair area and allow adhesive to cure for time recommended by the manufacturer. **(STEP 4)**



STEP 4

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Figure 3-14. Rudder Honeycomb Separation Repair

(4) Seal all leaks with sealant MIL-S-81733 class B 1/2. Surfaces to be cleaned with clean cloth and methyl-ethyl-ketone prior to applying sealant.

NOTE

To assure that sealant penetrates into all openings, apply sealant while assembly is subjected to a slight vacuum (approximately 7 PSIG). After sealant has been cured, recheck assembly (submerged) and repeat sealing process until all leaks are sealed.

j. Remove union fitting (Part No. AN815-3) and install plug machine thread FSN 4730-528-4871 or suitable substitute with sealant MIL-S-81733 class B.

k. To identify sealed fin tip panel, paint or stencil "SEALED" and date on the upper rib.

l. To identify sealed rudder paint or stencil date and a red dot in center of bottom rib.

CAUTION

Position light, IFF antenna access door, wave guide antenna slot, and forward channel must be sealed, using sealant, MIL-S-81733.

m. Reinstall fin tip panel and rudder in reverse order of removal.

3-47. Vertical Stabilizer – Sealing to prevent migration of foreign objects into rudder controls area.

3-48. Seal all openings, including structural mismatches, tooling holes, lightning holes, and holes caused by removal of equipment in the following areas: (1) Rib at WL 65.30 between spar 4 and 5 (Door 161). (2) Rib at WL 59.40 between spar 4 and 3 (Door 157). (3) Rib at WL 49.50 between spar 3 and 1 (Door 153). (4) Rib at WL 36.50 between spar 3 and 2 (Door 153). (5) Leading edge spar between WL 36.50 and WL 121.71. (6) Along spar 3 between WL 49.50 and WL 59.40. (7) Along spar 4 between WL 59.40 and WL 65.30. All holes 1/2 inch in diameter or less will be sealed with sealant MIL-S-8802. All holes larger than 1/2 inch in diameter will be sealed by fabricating appropriate size patch plate from QQ-A-250/5 (2024T3) 0.040 thick. Attach plate with a minimum of 4 each MS20600AD4 rivets. Apply sealant MIL-S-8802 to faying surfaces of patch plates prior to installation.

NOTE

Perform one time inspection for debris prior to sealing.

3-49. JIGS.

3-50. Figure 3-16 shows the master tooling fixture for the vertical fin assembly.

3-51. Packing and Crating — Fin Tip and Rudder.

3-52. Figures 3-17 and 3-18 illustrate the approved packing and crating methods for shipment of the rudder and fin tip. These containers are made in accordance with Specification MIL-C-25731, Type 1, Class 1 and 2. Class 1 is for air shipment; Class 2 is for domestic shipment. Specifications MIL-P-116 and MIL-B-121 explain the approved methods and materials used in packing these items. Crates shall be marked in accordance with Specification MIL-STD-129, the words "Removable End," and "Reusable Crate" shall be stenciled in their proper places. See table 1-LII for center of balance data.

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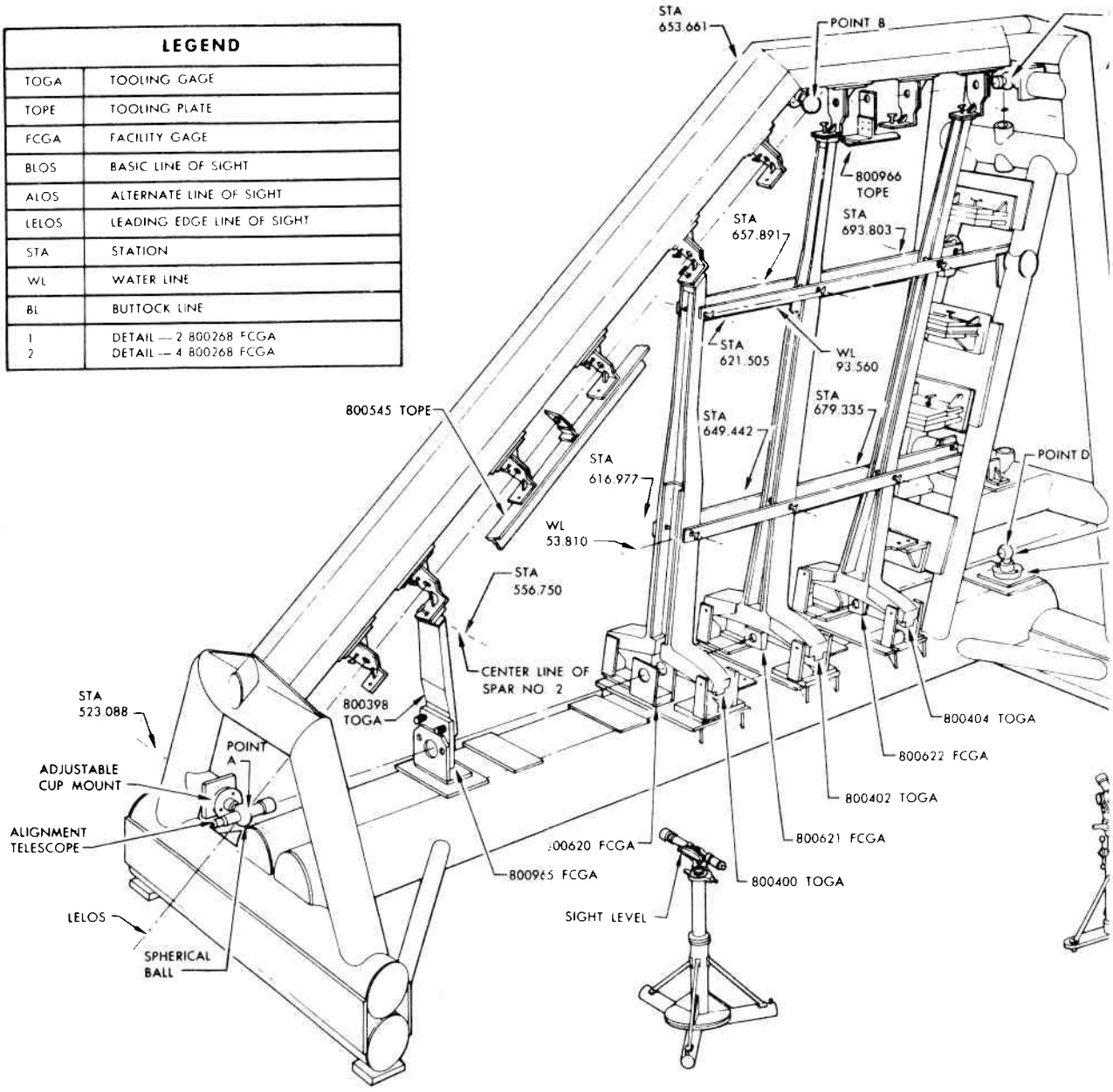
All data on page 3-21 and 3-22 including figures 3-15 and 3-15A Deleted.

LEGEND	
TOGA	TOOLING GAGE
TOPE	TOOLING PLATE
FCGA	FACILITY GAGE
BLOS	BASIC LINE OF SIGHT
ALOS	ALTERNATE LINE OF SIGHT
LELOS	LEADING EDGE LINE OF SIGHT
STA	STATION
WL	WATER LINE
BL	BUTTOCK LINE
1 2	DETAIL — 2 800268 FCGA DETAIL — 4 800268 FCGA



GAGES USED FOR MASTERING FIXTURE.

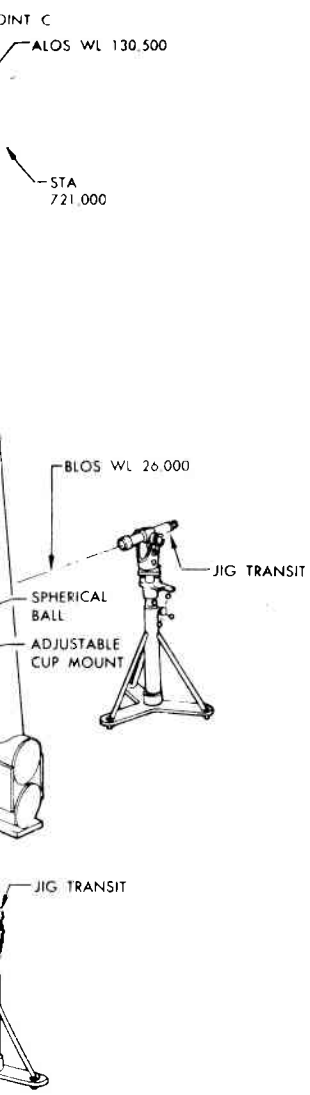
a. Tooling Plate, 800545.
b. Tooling Plate, 800966.
c. Tooling Gage 800398 with Facility Gage 800965.
d. Tooling Gage 800400 with Facility Gage 800620.
e. Tooling Gage 800402 with Facility Gage 800621.
f. Tooling Gage 800404 with Facility Gage 800622.

OPTICAL TOOLING EQUIPMENT REQUIRED

a. Two jig transits.
b. Two alignment scopes.
c. One sight level.
d. Two 2¼-inch diameter targets with light sources.
e. Two 3½-inch diameter spherical balls.
f. Three 1½-inch diameter plastic targets.
g. One auto-reflection mirror.
h. One set of 30 foot inside micrometers.

a. To be
b. To as
No. 4
c. To lin
No. 5

06 03 213.1C



TOOL FUNCTION

used as a master mating fixture.
emble and drill fin spars No. 2, No. 3,
nd No. 5 and leading edge spar No. 1.
bore the rudder hinge fittings on spar

OTE:
FER TO SECTION I FOR USE OF OPTICAL
UIPMENT

MASTERING PROCEDURE FOR MASTERING FIXTURE

NOTE

STEPS A AND B ESTABLISH POINT A AT STATION 523.086 AND POINT D AT STATION 721.000. THE HORIZONTAL ALIGNMENT BETWEEN POINTS A AND D ESTABLISHES WATER LINE 26.000, THE BASIC LINE OF SIGHT.

a. Level fixture as follows:
   (1) Set up sight level away from and to one side of fixture.
   (2) Level fixture and establish a horizontal alignment of points A and D.
   (3) Refer to Section I for leveling procedures using the sight level.

b. Establish the linear distance between points A and D by using the 30-foot inside micrometer and measuring the distance between points A and D, as shown on sheet 2.

c. Establish point C in a vertical plane and 90 degrees to the basic line of sight as follows:
   (1) Set up one jig transit away from and to one side of point D to establish a true vertical plane between points D and C.
   (2) Set up the second jig transit in line with the basic line of sight at the aft end of the fixture to hold point C in a horizontal plane with points A and D.
   (3) Refer to Section I for procedure on leveling the jig transit.
   (4) To gain the proper dimension between points D and C, use the 30-foot inside micrometer as shown on sheet 2. This establishes point C at station 721.000 and water line 130.500.

d. Establish point B in horizontal plane with point C and perpendicular to the basic line of sight as follows:
   (1) Mount the sight level away from and to one side of the fixture.
   (2) Mount a jig transit at the aft end of the fixture and in line with the basic line of sight.
   (3) Using the 30-foot inside micrometer, establish point B at station 655.661 and water line 135.500.
   (4) Using the 30-foot inside micrometer, measure the distance between points A and B. If this dimension checks with the dimension given on sheet 2, geometry of fixture is complete.

e. Install tooling and facility gages for spars No. 2, 3, 4 and 5 and leading edge spar No .1.
   (1) Mount an alignment telescope with a spherical ball at point A.
   (2) Mount the 2¼ inch diameter targets with light source in spherical balls at point B.
   (3) Align scope at point A with target at point B. Refer to Section I for use of alignment telescope.
   (4) Mount tooling angle, with facility gages attached, on the fixture and align facility gages approximately with basic line of sight.
   (5) Install 1½-inch plastic target on facility gages and align facility gages with basic line of sight.
   (6) Install the facility gage details, -2 and -4 to establish the proper angularity of spars No. 3, 4, and 5.
   (7) Mount the alignment telescope with a spherical ball at point C.
   (8) Mount the 2¼-inch diameter target with light source in the spherical ball at point B.
   (9) Align telescope at point A with target at points B and D.
   (10) Align telescope at point C with targets at points B and D.
   (11) Install the 800966 tooling plate in the fixture and pin as shown to top of spars No. 4 and 5.
   (12) Install the 800545 tooling plate in the fixture and pin as shown to top of spar No. 3.
   (13) Install the 1½-inch plastic targets in tooling plates 800545 and 800966.
   (14) Using an alignment telescope at point A, align tooling plate 800545 with target at point B.
   (15) Using alignment telescope at point C, align tooling plate 800966 with target at point B.
   (16) Index tooling gage 800398 to tooling plate 800545 and bring into line of sight between points A and B. Control the vertical and horizontal station planes by autoreflection (see figure "Principle of Autoreflection" in Section I.

Figure 3-16. Master Tooling — Vertical Fin (Sheet 1 of 2)

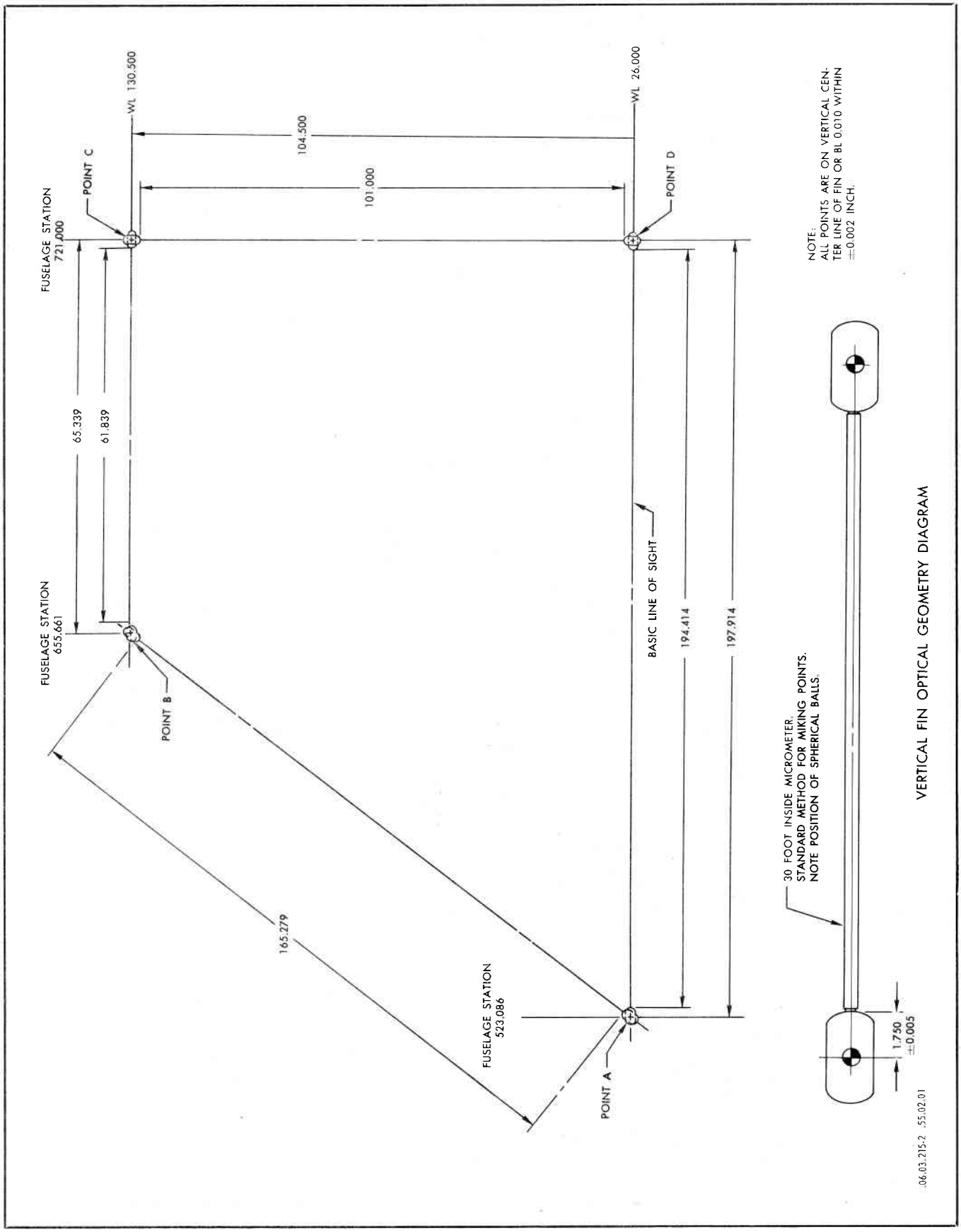
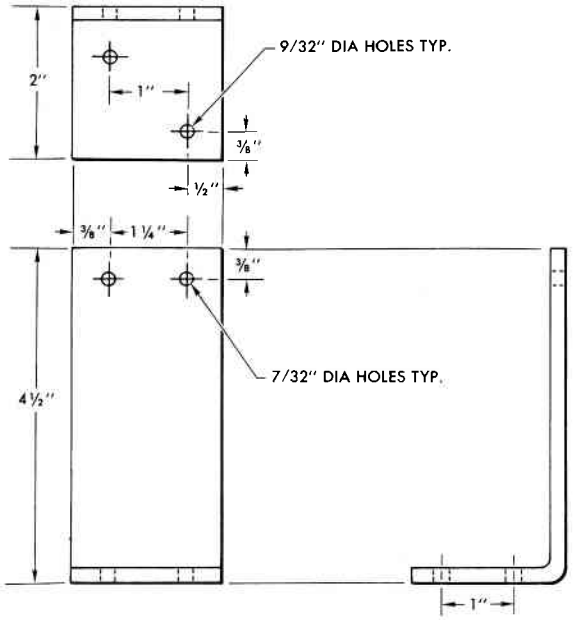
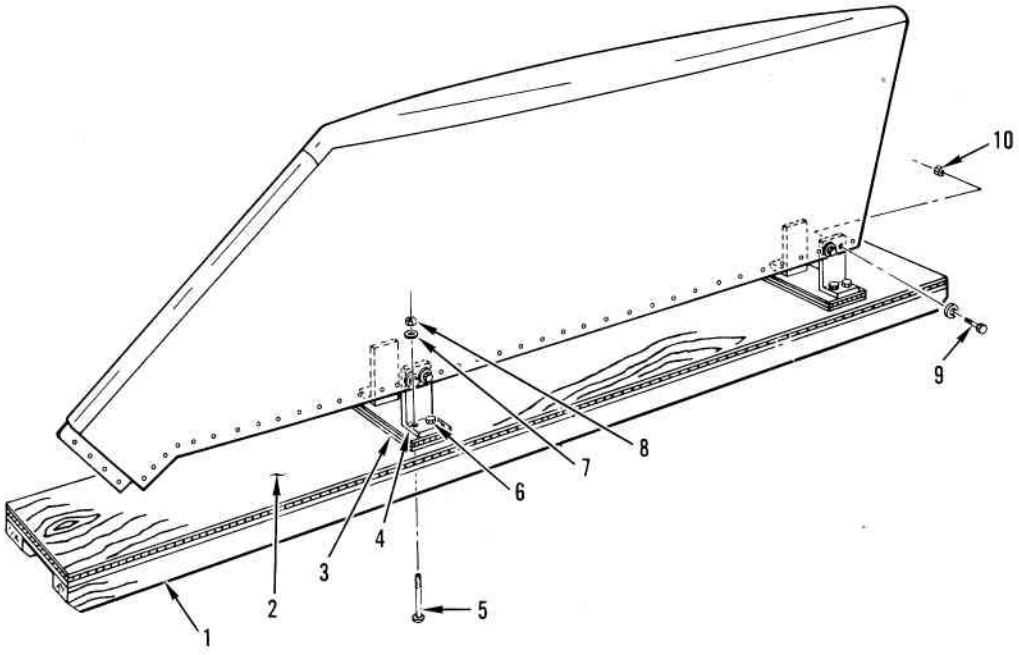


Figure 3-16. Master Tooling — Vertical Fin (Sheet 2 of 2)



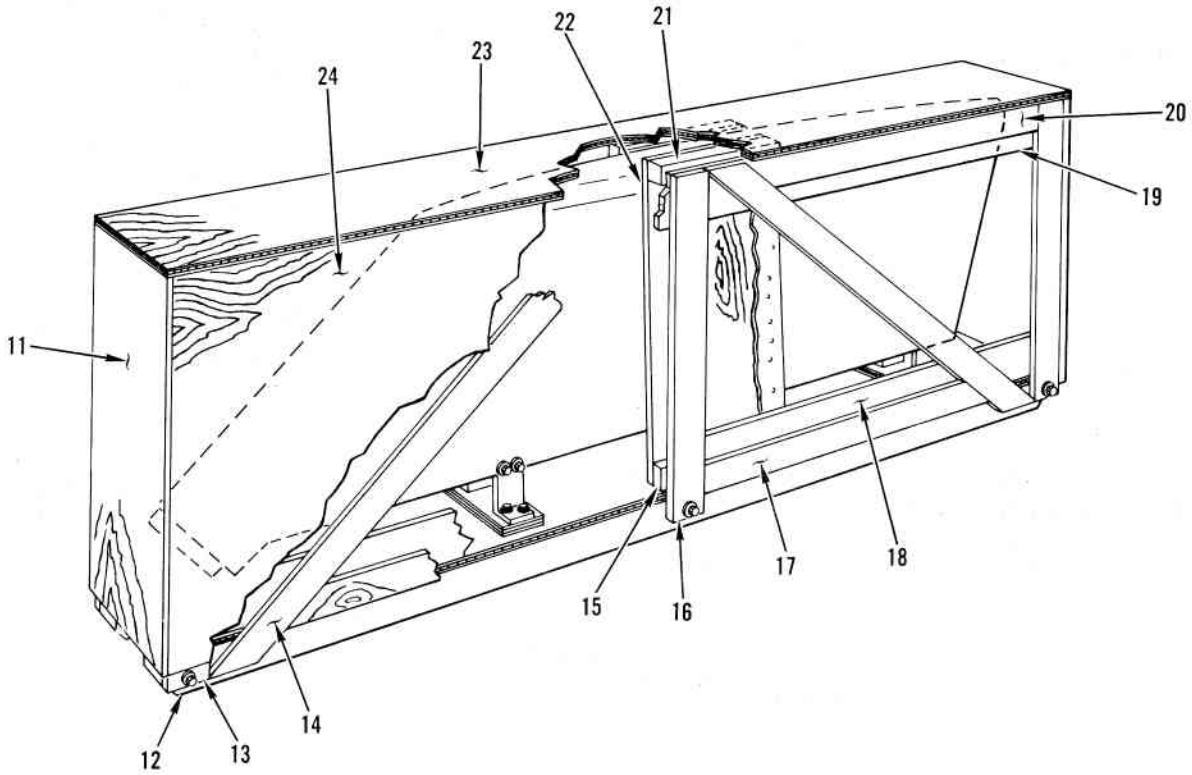
VIEW OF MOUNT ANGLE



MATERIALS				
NAME	DESCRIPTION	TYPE	PART NO.	NO. REQUIRED
SKID	1-¾" x 1-¾" x 87-½"	LUMBER	1	2
FLOOR	¼" x 8" x 87"	PLYWOOD	2	1
LOAD BEARING MEMBER	¾" x 3-⅝" x 6-½"	LUMBER	3	2
MOUNT ANGLE	⅛" x 2" x 6-½"	STEEL	4	4
CARRIAGE BOLT	¼" x 3"	STEEL	5	4
MACHINE BOLT	¼" x 1-½"	STEEL	6	4
WASHER	¼"	STEEL	7	4
NUT	¼"	STEEL	8	8
BOLT	AN507-1032-10	STEEL	9	8
NUT	AN364-1032	STEEL	10	8

06.03.281-1 .53.03.04

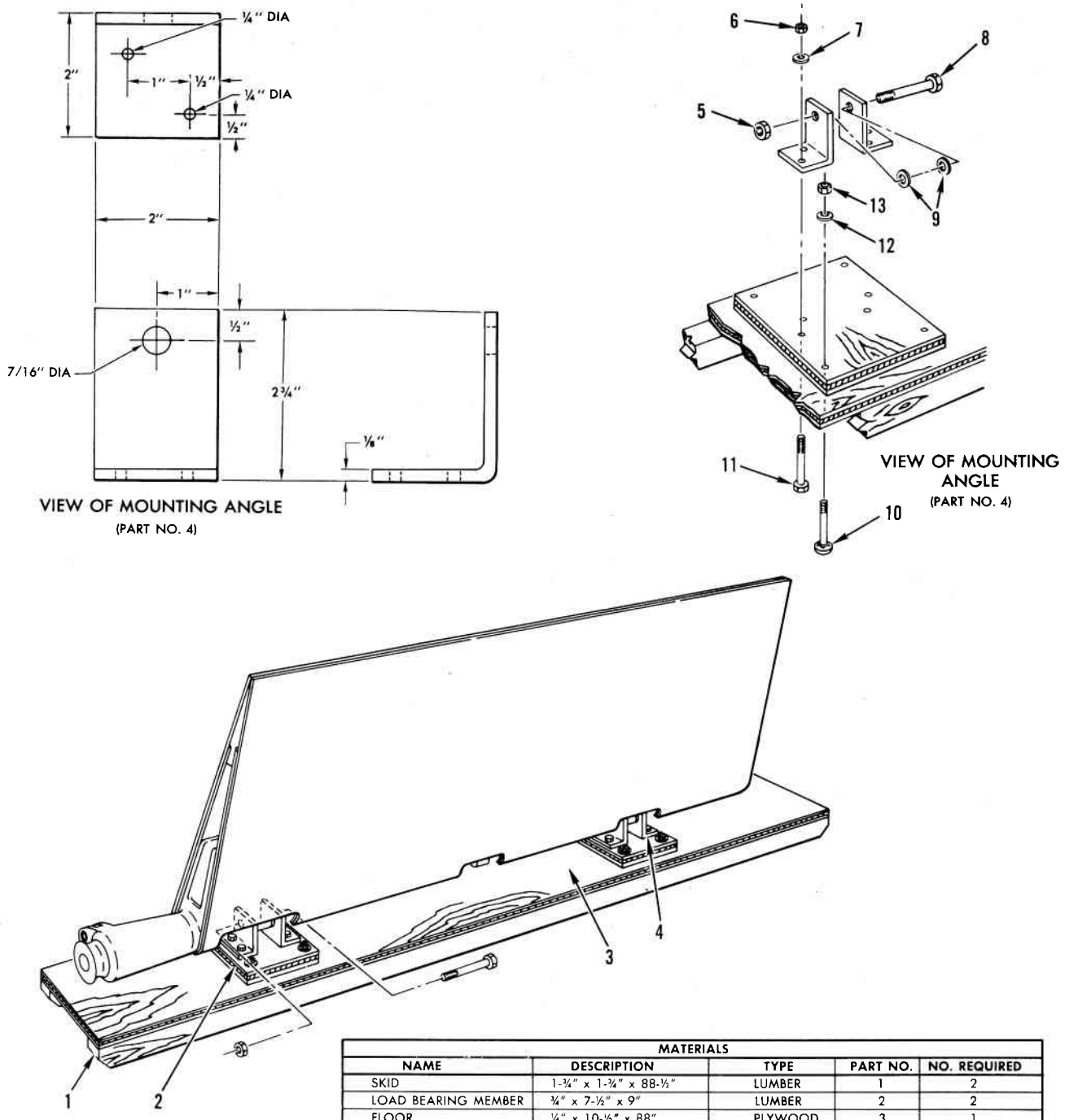
Figure 3-17. Packing and Crating — Fin Tip (Sheet 1 of 2)



MATERIALS				
NAME	DESCRIPTION	TYPE	PART NO.	NO. REQUIRED
SHEATHING	¼" x 9-¾" x 24"	PLYWOOD	11	2
LAG SCREW	5/16" x 2"	STEEL	12	6
WASHER	5/16"	STEEL	13	6
DIAGONAL CLEAT	¾" x 3" x 49"	LUMBER	14	4
BLOCK	¾" x 1" x 8"	LUMBER	15	2
MOUNT ANGLE	⅛" x 2" x 6-½"	STEEL	16	4
FILLER CLEAT	¾" x 1-¾" x 30"	LUMBER	17	4
LONGITUDINAL CLEAT	¾" x 3" x 87"	LUMBER	18	2
FILLER CLEAT	¾" x 1-¾" x 32-½"	LUMBER	19	4
LONGITUDINAL CLEAT	¾" x 3-⅝" x 87"	LUMBER	20	2
BLOCK	1-¾" x 1-¾" x 8"	LUMBER	21	2
HOLDING FIXTURE	¼" x 8" x 24"	PLYWOOD	22	2
SHEATHING	¼" x 9-¾" x 87-½"	PLYWOOD	23	1
SHEATHING	⅛" x 23-¾" x 87"	PAPER-OVERLAID VENEER	24	2

.06.03.281-2 .53.03.04

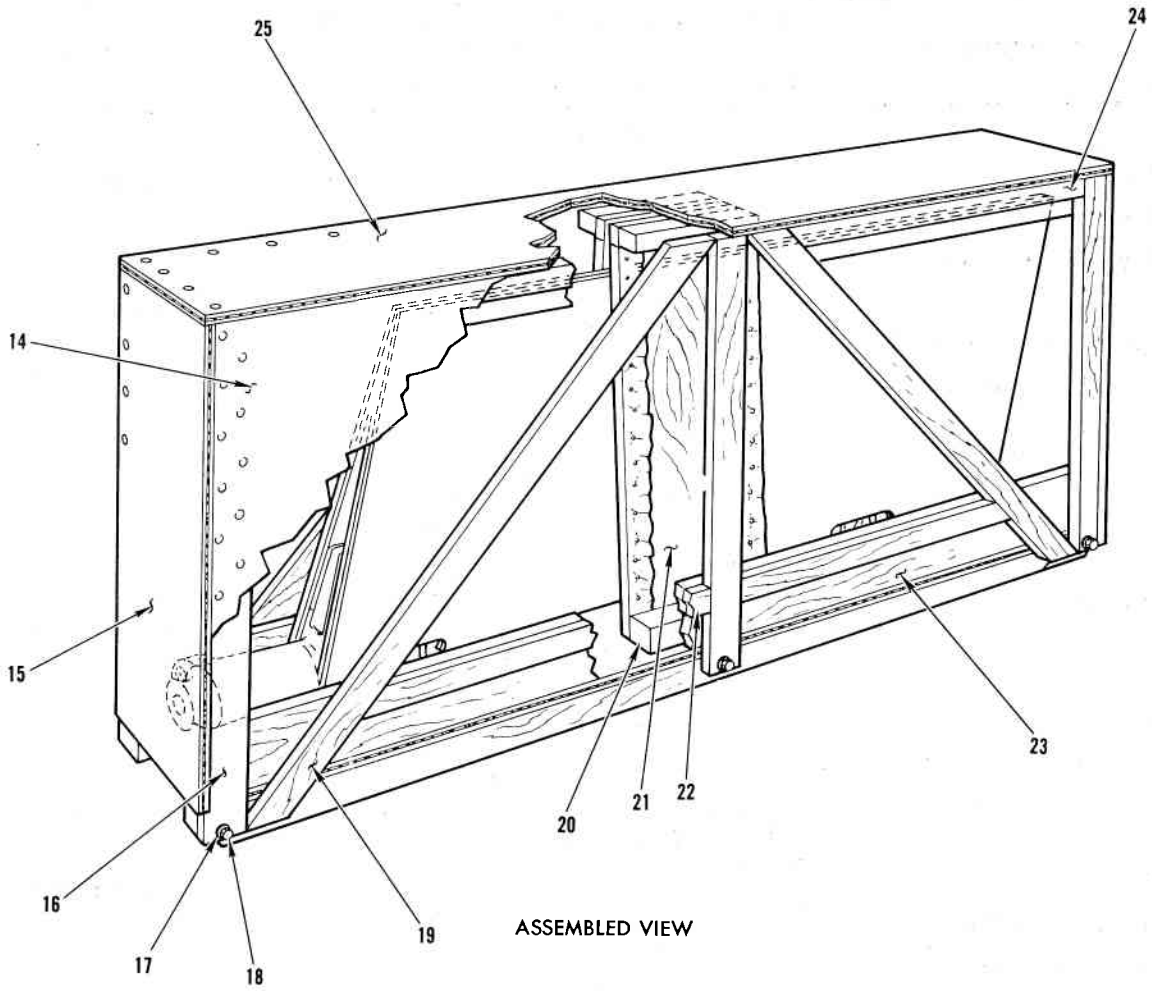
Figure 3-17. Packing and Crating — Fin Tip (Sheet 2 of 2)



MATERIALS				
NAME	DESCRIPTION	TYPE	PART NO.	NO. REQUIRED
SKID	1-¾" x 1-¾" x 88-½"	LUMBER	1	2
LOAD BEARING MEMBER	¾" x 7-½" x 9"	LUMBER	2	2
FLOOR	¼" x 10-½" x 88"	PLYWOOD	3	1
MOUNT ANGLE	⅛" x 2" x 4⅞"	STEEL	4	4
NUT	AN-365-720	STEEL	5	2
NUT	¼"	STEEL	6	8
WASHER	¼"	STEEL	7	8
BOLT	AN-22	STEEL	8	2
WASHER	⅜"	PHENOLIC	9	2
CARRIAGE BOLT	¼" x 3"	STEEL	10	8
MACHINE BOLT	¼" x 1-½"	STEEL	11	8
WASHER	¼"	STEEL	12	8
NUT	¼"	STEEL	13	8
SHEATHING		PAPER-OVERLAID VENEER	14	2

06.03.282-1 .53.04.04

Figure 3-18. Packing and Crating — Rudder (Sheet 1 of 2)



ASSEMBLED VIEW

MATERIALS				
NAME	DESCRIPTION	TYPE	PART NO.	NO. REQUIRED
SHEATHING	¼" x 12-¼" x 31-¼"	PLYWOOD	15	2
VERTICAL CLEAT	¾" x 3" x 33"	LUMBER	16	6
LAG SCREW	5/16" x 2"	STEEL	17	6
WASHER	5/16"	STEEL	18	6
DIAGONAL CLEAT	¾" x 3" x 52"	LUMBER	19	4
BLOCK	1-¾" x 1-¾" x 12"	LUMBER	20	4
HOLDING FIXTURE	¼" x 12" x 31-¼"	PLYWOOD	21	2
FILLER CLEAT	¾" x 1-¾" x 32"	LUMBER	22	4
LONGITUDINAL CLEAT	¾" x 3" x 88"	LUMBER	23	2
FILLER CLEAT	¾" x 1-¾" x 34"	LUMBER	24	4
SHEATHING	¼" x 12-¼" x 88-½"	PLYWOOD	25	1

06.03.282-2 53.04.04

Figure 3-18. Packing and Crating — Rudder (Sheet 2 of 2)

TABLE 3-I

Negligible Damage Limits — Tail Group

COMPONENT	TYPE AND CLASS OF DAMAGE ALLOWED AFTER REWORK					REMARKS
	Scratch	Nick	Dent	Hole	Crack	
FIN STRUCTURE						
Plating	I	I	*	*	*	Honeycomb Core.
Leading Edge Spar Rail	I	I	*	I	*	
Leading Edge Spar Web	II	II	I	I	I	
Spar No. 2	I	I	*	I	*	Titanium Forging.
Flange Spar Nos. 3, 4, and 5	I	I	*	I	*	
Web Spar Nos. 3, 4, and 5	II	II	I	I	*	
Rib Flange	II	II	II	II	I	
Rib Web	III	III	III	III	II	
Rib Stiffeners	III	III	I	III	II	
Canted Rib—Bay 3	I	I	*	*	*	
Hinge Fittings		Refer to an Aeronautical Structural Engineer				
LEADING EDGE STRUCTURE						
Plating	I	I	*	*	*	
Doublers	I	I	*	*	*	
Ribs	I	III	II	II	II	
FIN TIP STRUCTURE (LOWER PANEL)						
Plating	I	I	*	*	*	Honeycomb Core.
Channel Leading Edge	II	II	I	I	I	
Wedge Trailing Edge	III	III	II	II	II	
Lower Channel	I	I	I	I	*	
FIN TIP STRUCTURE (UPPER PANEL)						
Laminate Skin, Fiberglass.	–	–	*	*	*	Refer to paragraph 3-21 for limitations.
Forward Rib	II	II	I	II	II	
Lower Ribs	II	II	I	II	II	
RUDDER STRUCTURE						
Plating	I	I	*	*	*	Honeycomb Core.
Front Spar	I	I	*	*	*	
Upper Rib	III	III	II	II	II	
Lower Rib	I	I	*	*	*	
Trailing Edge Wedge	III	III	II	II	II	
Hinge Fittings		Refer to an Aeronautical Structural Engineer				
Actuating Arm		Refer to an Aeronautical Structural Engineer				

*Component must be repaired or replaced

3-53. VERTICAL STABILIZER ALUMINUM HONEYCOMB PANEL REPAIRS – DEPOT LEVEL ONLY.

3-54. General Information - Materials:

a. Honeycomb core, aluminum alloy 5052, 1/8 inch hexagonal cell, 0.0002 inch foil, meeting specification MIL-C-7438D, Type 1D, non-perforated:

(1) Size 28 inch x 96 inch x 0.329 ± 0.005 inch, FSN 5680L9642002049.

(2) Size 28 inch x 96 inch x 0.319 ± 0.005 inch, FSN 5680L9689152049.

b. Aluminum sheet, 2024 T86, bare, 0.020 inch by 48 inch by 144 inch, FSN 9535-684-1429.

c. Aluminum sheet, 2024 T86, bare, 0.025 inch by 48 inch by 144 inch, FSN 9535-684-1429.

d. Adhesive Film, metal to core and metal to metal.

(1) Requirements:

(a) Usage. This repair procedure is basically written for use of the Aerobond 3030 (see paragraph 3-54. d. (2)) adhesive. The adhesives listed in paragraph 3-54. d. (3) are alternates for use when the paragraph 3-54.d. (2) adhesive is not available. If paragraphs 3-54. d. (2) or 3-54. d. (3) materials are not available, and a work stoppage occurs, the substitutes listed under paragraph 3-54. d. (4) may be used. These substitutes should not be normally used in regular production. If adhesives other than the one listed under paragraph 3-54. d. (2) are used, changes will have to be made in the process to accomodate the different cure requirements.

(b) Storage and Handling. The adhesives listed under paragraph 3-54. d. are perishable and require low temperature shipment and storage (0°F or less).

(c) Adhesive Properties. The adhesives listed in paragraphs 3-54. d. (2) and 3-54. d. (3) are considered serviceable if they meet the requirements of MIL-A-25463, Type II and MMM-A-132, Type II and in addition, develop a metal-to-metal T peel strength in excess of 10 lbs. per inch width.

(d) Age Control. Age control shall be based on a 6 month shelf life for storage at 0°F. Testing of incoming adhesives for conformance to the requirements for the adhesive shall be at the descretion of Quality Control.

(2) Principal Adhesive: Aerobond 3030, Adhesive Engineering Company, 1411 Industrial Road, San Carlos, California 94070. Order in a nominal 0.090 lb./sq. ft. density.

(3) Alternates (order in a nominal 0.090 lb/sq. ft. density).

(a) Adhesive films from Adhesive Engineering.

1 Aerobond 3034.

2 Aerobond 3037.

3 Aerobond 3038.

(b) Plastilock 729, B.F. Goodrich Adhesive Products, 500 S. Main Street, Akron, Ohio 44318.

(4) Substitutes.

NOTE

These materials are normally stocked and will meet Convair Specification 8-01319, but will not meet the requirements of paragraph 3-54. d. (1) (c). Serviceability requirements shall be based on the requirement of paragraph 4.2.2. of Convair Spec. 8-01318.

(a) FR-7035, Fiber Resin Corporation, 170 West Providence Avenue, Burbank, California 91502.

(b) EA 9601, Hysol Division, The Dexter Corporation, 2850 Willow Pass Road, Pittsburg, California 94565.

e. Core edge potting compound, low expansion type.

(1) Requirements.

(a) Usage. This repair procedure has been prepared for use of the film type materials listed in paragraph 3-54.e.(2). Paste type materials are listed in paragraphs 3-54.e.(3) and 3-54.e.(4) and may be used in place of the paragraph 3-54.e.(2) materials if desired for convenience and for a reduction in production time. If the paste type materials are used, changes will have to be made in the process to accomodate the different cure requirements.

(b) Storage and Handling. The potting compounds listed in paragraph 3-54. e. (2) are perishable and require low temperature shipment and storage (0°F or less).

(c) Physical Properties.

1 Core Splice Films (paragraph 3-54. e. (2) materials) only.

a A standard 1/2 inch overlap shear strength equal to or in excess of 1050 psi at -65°F and at 77°F, and 900 psi at 216°F. (Aluminum 2024 T81 adherents, 0.065 inch thick by 1 inch wide, a 0.050 inch thick by 0.4 x 1.0 inch bond line, vacuum bagged and cured at the conditions of paragraph 3-56. m.)

b Cured thickness (free expansion during cure at 20 inches of vacuum following the paragraph 5.13 cure process) between 0.050 and 0.090 inches.

2. Core splice films and pastes (paragraphs 3.54. d. (2), 3-54. d. (3) and 3-54. d. (4) materials). When used as a core splice material to splice two sections of core together to form a continuous sandwich panel, and then assembled with the splice line perpendicular to the long panel direction and located halfway between the load and support axis, the resulting cured panel when tested following MIL-A-25462, shall develop a core shear strength equal to or better than that required by paragraphs 4.2.2.2 and 4.2.4.2 of Convair specification 8-01319.

(d) Age Control. Age control for the film type potting compounds of paragraph 3-54. d. (2) shall be based on 6 month shelf life for storage at 0°F. Age control for paragraphs 3-54. d. (3) and 3-54. d. (4) materials shall be 6 months at 77°F testing of incoming potting compounds for conformance to the requirements of paragraph 3-54. d. (1) (c) shall be at the discretion of Quality Control.

(2) Principal Core Splice Films:

(a) AF-3002, 3M Company, Adhesives, Coatings and Sealers Division, 3M Center, St. Paul, Minnesota 55101.

(b) Plastilock 654GD, B.F. Goodrich Adhesive Products, 500 S. Main St., Akron, Ohio 44318.

(c) Aerobond 3026, Adhesive Engineering Company, 1411 Industrial Road, San Carlos, California 94070.

NOTE

Request a nominal thickness of 0.050 inch.

(3) Paste, no expansion, two component syntactic foam type.

(a) FR-13 Paste and No. 8 Hardener, Fiber-Resin Corporation (see paragraph 3-54. d. (4) (a)).

(b) Epocast 1310 Mod 2 and No. 9228 Hardner, Furane Company, 5121 San Fernando Road, West Los Angeles, California 90039.

(4) Pourable liquid, expansion, one component foam type.

(a) Thermofoam 3051, Adhesive Engineering (see paragraph 3-54. d. (2)).

f. Cleaning Solvents.

(1) Methyl ethyl ketone, specification TT-M-261, FSN 6810-281-2762, 5 gallon can.

(2) Tetrachloroethylene (perchloroethylene), Specification 0-T-236, FSN 6810-819-1128, 5 gallon can.

g. Corrosive Chemicals.

(1) Pasa-Jell 105, metal surface cleaner and conditioner, SEMCO Division, PRC Corporation, PO Box 61037, Los Angeles, California 90061.

(2) Sulfuric Acid, 96%, Specification 0-S-809, Type 1, Class I.

(3) Sodium Dichromate, Specification 0-S-595, FSN 6810-281-2686, 100 lb. bag.

h. Tank Type Solutions.

(1) Oakite Stripper SA, Oakite Products, Inc., So. Valley Road, Berkeley Heights, N.J. 07922.

(2) Aluminum Deoxidating Solution.

i. Release Agents (Purchase as Spray Cans).

(1) Mold Release (one of the following):

(a) Number 1711 Release Agent, Contour Chemical Company, 4 Draper Street, Woburn, Mass 01801.

(b) FreKote-33, FreKote Incorporated, P.O. Box 825, Boca Raton, Florida 33432.

(c) Number 3070 Epoxy Mold Release, Crown Industrial Products Company, 198 Stateline Road, Hebron, Illinois 60043.

(2) Fluorocarbon Surface Release Agent (one of the following):

(a) Vydax AR, E.I. duPont de Nemours and Company, Petroleum Chemicals Division, Wilmington, Delaware 19898.

(b) CHR Rulon Spray No. 2, Connecticut Hard Rubber Company, New Haven, Connecticut 06509.

(c) Number 6075 Dry Fluorocarbon Lubricant, Crown Industrial Products Company, 198 Stateline Road, Hebron, Illinois 60034.

j. Identification Tag Adhesive, Specification MIL-A-8623, Type I, FSN 8040-270-8137, 1-quart kit or FSN 8040-900-6296, 1-pint kit.

3-55. General Information - Equipment.

a. Autoclave, Bldg. 655, with bondform cart and accessories.

b. Panel Bondforms (one with a flat surface and one with a curved surface to match the shape of Part Number 8-14152-3 and -4).

c. Vacuum Bag Materials. Vacuum bag film, sealing tape, glass cloth, bleeder cloth, hoses, etc. (see reference in paragraph 3-59. a. (5)).

d. Adhesive handling and layup facilities. Clean layup room with 0°F adhesive storage freezer (see reference in paragraph 3-59. a. (4)).

e. Standard FPL Etch System for Aluminum.

(1) Etch Solution Tank

WARNING

Spattering or a violent explosion may occur if water is added to sulfuric acid. Sulfuric acid should be added to water slowly and carefully with stirring. An exhaust system consistent with OSHA Standards and approved by base bio-environmental engineers must be provided.

(a) Set up a corrosion resistant, agitated and heated tank to contain the etch solution. Add sufficient sulfuric acid (paragraph 3-54. g. (2)), sodium dichromate (paragraph 3-54. g. (3)) and deionized water to make an initial solution as follows:

H_2O	30 parts by weight
H_2SO4	10 parts by weight
$Na_2Cr_2O_7$	4 parts by weight

The tank should be large enough to accommodate the frames with complete immersion.

(b) Set up heating controls on the tank to maintain a 155 + 5°F temperature during processing. (Heat may be turned off when tank is not in use.)

(c) During etch treatment of parts, the tank must be under agitation to obtain a satisfactory and uniform etch.

(d) Add deionized water, acid and sodium dichromate as required to maintain solution within the following limits during etching of aluminum parts:

H_2SO_4	280 to 290 gms/liter
$Na_2Cr_2O_7$	27 to 75 gms/liter
Cl (Chloride)	0 to 0.36 gms/liter
$Cr_2(SO_4)_3$	0 to 40 gms/liter
SO_4 (Sulfate)	274 to 530 gms/liter

NOTE

Operating controls on the tank can be based on solution specific gravity, adding deionized water to the tank to make up for losses so that the specific gravity is between 1.18 and 1.20 at operating temperatures.

If solution limits can not be obtained by additions of chemicals, the solution should be partially dumped and a fresh solution made up.

(e) Tank shall not be released for production use until solution is aged and approved (based on adhesive bond strength of test specimens).

(2) Rinse tank or spray rinse area, (final rinse capability) with deionized water.

(3) Drying area (or oven at 160°F if available) to dry off rinse water.

f. Personnel protective equipment. Rubber gloves, clean lint-free cotton gloves, aprons, face masks or shields, protective hand creams and dust respirators.

g. Clean part drying and temporary storage racks (to hold parts in a clean area while they are drying).

h. Cleaning Supplies. Clean cotton rags (lint and oil free) or clean cheesecloth, wiping tissues, solvent dispensing cans (safety type) and small plastic wash bottles.

i. Pasa-Jell application area. Facilities including drain to industrial sewer, water hoses for washing off the applied Pasa-Jell and a supply of deionized water for a final rinse.

j. Vapor Degreaser. Operate with tetrachloroethylene (paragraph 3-54. f. (2)). Degreaser should be located close to the layup room.

k. Stripper Tank. Set up and operate per Local Procedures, "Shop Service Test of Solvent Based Structural Adhesive Stripper."

l. Aluminum Deoxidating Cleaner Tank. As per Local Procedures, "Cleaning, Chromate Conversion Coating, Anodizing and Removing Anodic Coatings of Aluminum and Aluminum Alloys."

NOTE

The combined maximum limits of 160°F and a 6% solution concentration should be avoided as rapid discoloration of honeycomb core foil surfaces starts to occur at this condition.

3-56. PROCESS.

NOTE

- This process is abbreviated. Shop workers are assumed to be trained in structural adhesive bonding techniques.
- Absolute identification of part to aircraft must be retained since each panel has a unique hole pattern and must go back on the original aircraft in the same location.

a. Remove existing inner and outer skins from the panels. Use dry ice on skins to aid in the removal of skins. Identify the frame with the aircraft by engraving the aircraft tail

number and the part serial number on an exposed side edge of the frame.

b. Remove old honeycomb core from frame and discard.

c. Remove old adhesive from frame. Use methods in paragraphs 3-56. c. (1) or 3-56. c. (2) as available. Avoid method in paragraph 3-56. c. (1) if possible.

(1) Move frame to the grinding area and mechanically abrade off the old adhesive. Do not gouge the metal frame or remove metal to where the drawing dimension tolerances are exceeded. Do not grind off identification numbers.

WARNING

Wear approved face shield and dust respirator while abrading or sanding off the old adhesive.

(2) Stripping of old adhesive from frames, using the Oakite S-A soak process (paragraph 3-55. k.).

a. Soak degreased frames for 24 hours or longer as required.

NOTE

The tank should be large enough for complete immersion of the frames in the stripper, below the solution-seal layer interface. If a smaller tank is used, and only part of the frame is immersed at any given time, a corrosive condition will occur at both the air-seal layer and seal layer-solution interfaces. The rate of attack at the solution-water interface line is on the order of 1 to 3 mils (0.001")/day. (Within the solution the attack is neglibile, about 10 mils/year). Therefore, if small tanks are used, the frame should be moved every few hours to minimize the attack at any given spot.

(b) Once or twice every shift remove frame from solution and inspect for removal of adhesive and for the degree of corrosive attack on the metal by the stripper. Use aluminum scrapers to remove loosened core and adhesive residues. Wear rubber (neoprene) gloves to handle frames.

NOTE

The stripper attacks the primer underneath the adhesive layer and only softens the outer adhesive layer. The softening action is slow and may require immersion over a period of days. Since the stripper is corrosive, the frames must be regularly inspected for corrosion attack.

(c) Wash off stripper residues.

(d) If frame is discolored (smut), immerse briefly in one of the aluminum deoxidizing solutions to brighten the surface. Rinse off deoxidizing solution.

(e) Dry frame before transporting out of shop.

d. Layout. Cut and trim new outer and inner skins to fit the frame. Drill six holes in both skins for alignment during the bonding process.

e. Cut and trim honeycomb core (paragraph 3-54. a.) to fit frame openings. Observe drawing requirements for core ribbon direction and dimensional tolerances.

f. Preliminary cleaning of frames and skins (3-56. f. (1) or 3-56. f. (2)).

WARNING

Perform solvent cleaning operations in an approved cleaning cabinet or in a well ventilated area. Avoid prolonged breathing of vapors. Avoid eye and repeated skin contact. Keep solvents away from sparks and flames.

(1) Hand wipe method. Hand wipe frames and skins with MEK (paragraph 3-54. f. (1) and 3-58.) wet cloths or wiping tissues to remove mill markings, ink, grease or dust. Abrade off persistent deposits if MEK wipe treatment is not successful in removing the deposit.

(2) Solution Cleaning.

(a) Vapor degrease skins and frames.

(b) Solution clean parts in an aluminum deoxidizing cleaner (paragraph 3-55. j.).

(c) Rinse parts and inspect for contamination by the water break test method. Remove any spot contamination and repeat the cleaning and rinsing steps.

(d) Proceed to solution etch if available, otherwise dry part and route back to work area.

g. Surface Conditioning. Use method in paragraph 3-56. g. (1) if available, otherwise use method in paragraph 3-56. g. (2).

(1) Immerse outer skin and frame in the standard acid etch solution (paragraph 3-55. e.) for a period of from 12 to 16 minutes. Then remove and rinse in the rinse tank and finally rinse with deionized water. (See paragraphs 3-58. b. and 3-58. c.)

(2) Mechanically abrade or roughen the inner side of the outer skin. Wipe off any sanding residues with solvent

(paragraph 3-54. f.) and wiping cloths or tissues. (The frame does not need to be roughened.) Treat inner surface of skin and frame with Pasa-Jell 105 (paragraph 3-54. g. (1)). (See paragraphs 3-58. b. and 3-58. c.)

(3) Inspect the surface for contamination using the water break test immediately after the final rinse with tap water.

(4) Move the wet parts to a drying rack and let dry naturally in a dust-free, oil and contamination free area.

h. Inspect core parts for core burrs and defects (see reference, paragraph 3-59. a. (2)). Moderate and heavy burr should be corrected. Distorted cells should be straightened out. Parts with broken foil or with node separations interior to an outside area of two cells from the edges should be discarded and a new part obtained.

i. Clean honeycomb parts by immersion in a vapor degreaser for 30 seconds or more. Use only a clean degreaser that has a clean boiling pool. Remove to cool and re-imerse two or more times. Remove core and route to work area.

j. Move frame, outer skin and core parts to the layup room for adhesive application.

k. Apply adhesive to parts (see reference, paragraph 3-59. a. (4)).

(1) Inspect core sections for handling damage.

(2) Assemble core parts into frame using strips of edge to core adhesive (paragraph 3-54. e.).

NOTE

Adhesive film is unsupported and fractures easily when handled at low temperatures.

(3) Apply adhesive (paragraph 3-54. d.) and fit outer skin to honeycomb core and frame. Adhesive film should overlay core and frame structure. Avoid overlapping peices of adhesive film. (See paragraphs 3-58. f. and 3-58. g.)

(4) Insert temporary fasteners (previously coated with a mold release) through frame and outer skin to establish skin to frame alignment.

l. Vacuum Bag Panel to Bondform (see reference, paragraph 3-59. a. (5)).

(1) Bondform surface should have a realease agent on the surface. (See paragraph 3-58. d.)

(2) A fluorocarbon release agent may be applied lightly to the outer edges of the frame where adhesive bleed-out will occur during the cure cycle.

(3) Place panel so that the outer skin is against the bond form surface.

(4) Place one or more thermocouples against the bondform adjacent to the adhesive bond line.

(5) The pink silicone treated bleeder cloth may be used directly over the open side of the core and panel.

m. Cure Adhesive in Autoclave.

(1) Re-establish vacuum on vacuum bag with autoclave vacuum system.

(2) Check vacuum bag for leaks and close off any located leaks.

(3) Roll cart and bondform into autoclave, connect up the thermocouples and close the door.

(4) Set pressure controller to 5 psi and pressurize autoclave.

(5) When pressure has reached 5 psi, vent vacuum system and vacuum bag to the atmosphere.

(6) Reset pressure controller to 15 psi.

(7) Start heating autoclave. Set temperature controller set point to 365°F.

(8) Observe heat up rate. Limit rate of rise to between 10° and 2°F per minute.

(9) When bondline temperature has reached 350°F, reset temperature controller to 350°F. Maintain steady state conditions (cure) for a period of 45 minutes.

(10) Following cure period, shut off heat and cool autoclave.

(11) Start releasing pressure when bondline temperature is below 180°F.

(12) When autoclave has cooled to 100°F or less, open door and remove bondform and cart.

CAUTION

Wear asbestos gloves when removing hot items from the autoclave.

n. Remove vacuum bag and temporary fasteners.

o. Transport partially bonded panel to work area.

NOTE

Be careful in handling the panel to avoid damaging the exposed honeycomb core surface.

p. Using the frame as a drill guide, drill attaching holes through outer skin. Remove all drillings.

CAUTION

Use extreme care in drilling through the frame to be sure that the drill is properly aligned with the existing hole at all times.

q. Check core surface for proper mating with inner skin. Sand down any high points. Note any depressions around the frame region that will require special buildup to avoid "steps" in the inner skin. Contact SM/ALC/MANCA methods to perform this buildup.

WARNING

Perform solvent cleaning operations in an approved cleaning cabinet or in a well ventilated area. Avoid prolonged breathing of vapors. Avoid eye and repeated skin contact. Keep solvents away from sparks and flames. Use approved personal protective equipment (eye goggles/face shield) when using compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 psi. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

r. Inspect inner panel side for core burrs and defects (paragraph 3-59. d. (3)). Moderate and heavy burr should be corrected. Distorted cells should be straightened out if possible and broken foil areas potted. Contact for details. Remove any drilling chips with a light flow of clean air. Use a small stream of tetrachloroethylene (paragraph 3-54. f. (2)) to flush out any drill or sanding residues that appear to be adherent.

s. Wipe the frame surface to be bonded with clean rags or wiping tissues dampened with clean MEK (see paragraph 3-58).

t. Acid etch the inner skin.

u. Return the panel and treated parts to the layup room.

v. Apply film adhesive (paragraph 3-54. d.) to core and frame. Fit inner skin to panel using temporary fasteners to maintain alignment.

w. Vacuum bag panel to bondform per paragraph 3-56. l.

x. Cure panel per paragraph 3-56. m., only hold 350°F for one hour instead of 45 minutes indicated in paragraph 3-56. m. (9).

y. Remove vacuum bag, temporary fasteners, and transport panel to work area.

z. Using frame as a guide, drill attaching holes through inner skin. Remove all drilling chips.

CAUTION

Use extreme care in drilling through the frame to be sure that the drill is properly aligned with the existing holes at all times.

aa. Remove any adhesive flash and finish panel.

ab. Apply identification tag.

(1) Prepare an AN-7510-1-Rev. 9 identification tag with the following information:

AIRCRAFT MOD. F-106

PART NO. (obtain from drawing)

CONT NO. (enter aircraft tail number from frame)

SERIAL NO. (part serial number from frame engraved number)

MODIFICATION INCORPORATED TO 1F-106A-3 (date, month-year rebuilt)

(2) Roughen up back side of tag and clean back side.

(3) Prepare a small quantity of adhesive (paragraph 3-54. j.) and bond tag to inner skin. (Adhesive is a room temperature curing epoxy adhesive.)

ac. Apply chemical conversion coating, MIL-C-5541, then prime and overcoat in accordance with T.O. 1-1-4 and T.O. 1-1-8.

3-57. Inspection or Testing.

a. Perform ultrasonic inspection of completed panels for delaminations only at the request of Quality Control. Panels will not normally require ultrasonic inspection. Allowable defects uncovered during inspection are as follows:

(1) No single unbonded area of more than one inch in diameter.

(2) Less than 10% cumulative bonding void on any straight line across the surface of the panel in any direction.

b. Defects found in panels shall be repaired in accordance with directions given in Sections 10 and 11 of this publication.

c. The adhesives, the parts, the cleaning processes and the bonding processes are to be controlled in accordance with the standards referenced in paragraph 3-59. a.

3-58. Health and Safety Notes.

a. MEK (paragraph 3-54. f. (1)) is hazardous and flammable. Tetrachloroethylene (paragraph 3-54. f. (2)) is hazardous, but is not flammable. T.O. 42A1-1-3 should be consulted for the proper handling and storage of these solvents.

b. Pasa-Jell 105 (paragraph 3-54. g. (1)), Oakite S-A (paragraph 3-54. h. (1)), and sulfuric acid (paragraph 3-54. g. (2)) are acidic corrosive chemicals. Any spills of these materials should be immediately washed away with water. Residues may be treated with sodium bicarbonate to neutralize any remaining acid. When handling these materials in bulk, wear rubber aprons, rubber or PVC gloves and protective face shields.

c. Pasa-Jell 105 (paragraph 3-54. g. (1)) and sodium dichromate (paragraph 3-54. g. (3)) are oxidizing chemicals and may cause fires if these materials are combined with organic solvents (MEK) or other combustible materials (wiping tissues and cloths).

d. The spray release agents (paragraph 3-54. i.) will form hazardous mists when applied. The mists from the paragraph 3-54. i. (1) materials may be explosive and should not be applied in the vicinity of ovens or electrical switch gear. The mists from all the release agents should not be breathed, and the agents preferably applied in a well ventilated area. If the area is not ventilated, organic vapor protective masks should be worn when the agents are applied.

e. MEK (paragraph 3-54. f. (1)), tetrachloroethylene and Oakite S-A (paragraph 3-54. h. (1)) are considered volatile materials. (The volatile components in Oakite S-A are sulfur dioxide, dichloromethane and trace amounts of mercaptans. A water layer on top of Oakite S-A must be maintained at all times to block the evaporation of these volatile ingredients.) Do not inhale the vapors from these volatile materials and avoid skin contact. Wear protective gloves and approved organic vapor protective masks.

f. The adhesive materials listed in paragraphs 3-54. d. and 3-54. e. contain chemicals and volatile ingredients known to be toxic and irritating to the skin and eyes. These adhesives can cause dermatitis if skin contact occurs. Avoid skin contact with these adhesives by using gloves.

g. Adequate local ventilation should be provided where the volatile materials discussed in paragraph 3-58. e. are handled on work benches. If possible these materials should not be used in the layup room.

(1) The ventilation system shall provide lateral exhaust ventilation of 100 feet per minute at the work edge of the work bench.

(2) The type of ventilation system shall be coordinated with Bioenvironmental Engineering prior to planning and installation.

h. At the end of the day or after completion of the adhesive or solvent handling operations for the day, wash your hands thoroughly and then apply skin conditioner. Remember cleanliness is the best defense against dermatitis.

3-59. References.

a. Adhesive Bonding Standards. (Until these can be established, current shop practices and the referenced documents will be used as an interim measure.)

(1) Standard Acid Etch Process for Treating Aluminum and Aluminum Alloys Prior to Adhesive Bonding. (Reference North American Specification LA0106-006, paragraphs 8.1.4 and 15.2.2, and General Dynamics Specification FPS 1009D, paragraphs 3.3.1 and 4.1.1.2.)

(2) Standard Pasa-Jell Process for Treating Aluminum, Aluminum Alloys and Titanium Prior to Adhesive Bonding.

(3) Quality Standard for Honeycomb Core Defects. (Reference General Dynamics Specification FPS-1017 and FPS-1009D, paragraphs 3.1.1 through 3.1.1.4.)

(4) Standard Process for Storing, Handling and Applying Film Adhesives and Preimpregs. (Reference General Dynamics Specification FMS-1009D, paragraphs 2.1, 3.2, 5.1, and FPS-1016B.)

(5) Standard Vacuum Bag Process. (Reference General Dynamics Specifications FPS-1067A and FPS-1016B.)

(6) Quality Standard for Control of Adhesive Bonding Materials and Processes. (Reference General Dynamics Specifications FPS-1009D and FPS-1016B.)

(7) Process for Ultrasonic Inspection of Adhesive Bonded Metal Faced Sandwich Panels.