Sub-Section "C" Pre-Covering Details

Objective:
Finish the wings to the point of covering. This section describes installation of stringers, false ribs, end rib braces, the pitot tube, the trailing edges Installing the rivet backing strips on the tip ribs and fabricate the fabric reinforcement plates to fit around the strut attach brackets. If you are installing the optional wing tanks, lockers, or strobe lights, refer to the specific instructions for those options before you proceed.

STEP (1): Sand the rough edges off the #24001 (WST-28) Wood Stringers. Sand the slots in the upper edge of the rib webs. Slide the stringer into the slots from the tip end, and stop about 1/4" short of the last rib. (Stop short of the wing tank or locker.) Apply a bit of structural adhesive to the stringer at each rib and push it in and down to the bottom of the routed slot. Cut off any excess Stringer.

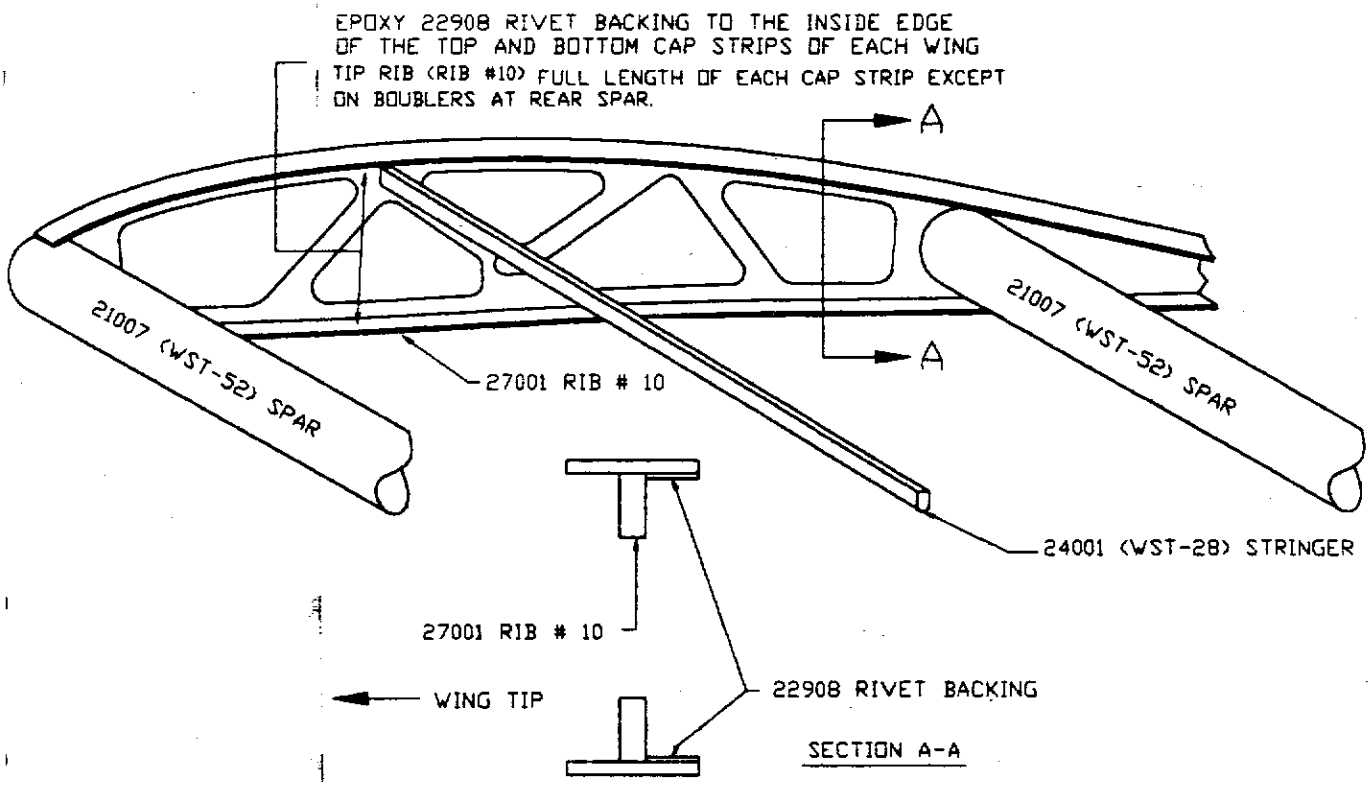

Fig. W-C-1
Stringer and Wing Tip Backing

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STEP (2): Lay out the spacing for the #24006 False Ribs on the spars and the stringer. Set three False Ribs between each rib with equal spacing (approximately 4 7/8") between them. Do not install False Ribs or Stringer in the wing tank or wing locker bays. Rough sand the top of the spar at each False Rib position and clean. Finish sand the edges of the False Ribs and bond them in place with structural adhesive. Tape across the top of the ribs to hold them in place and to keep them straight while the adhesive sets up. Some of our builders file a very shallow (1/16" deep) square notch in the #24001 Stringer for each #24006 False Rib. Refer to Plate W-2.

STEP (3): Lay a wing right side up on your work table or sawhorses. Varnish the wooden parts of the wings with three coats of a good eppoxy varnish.

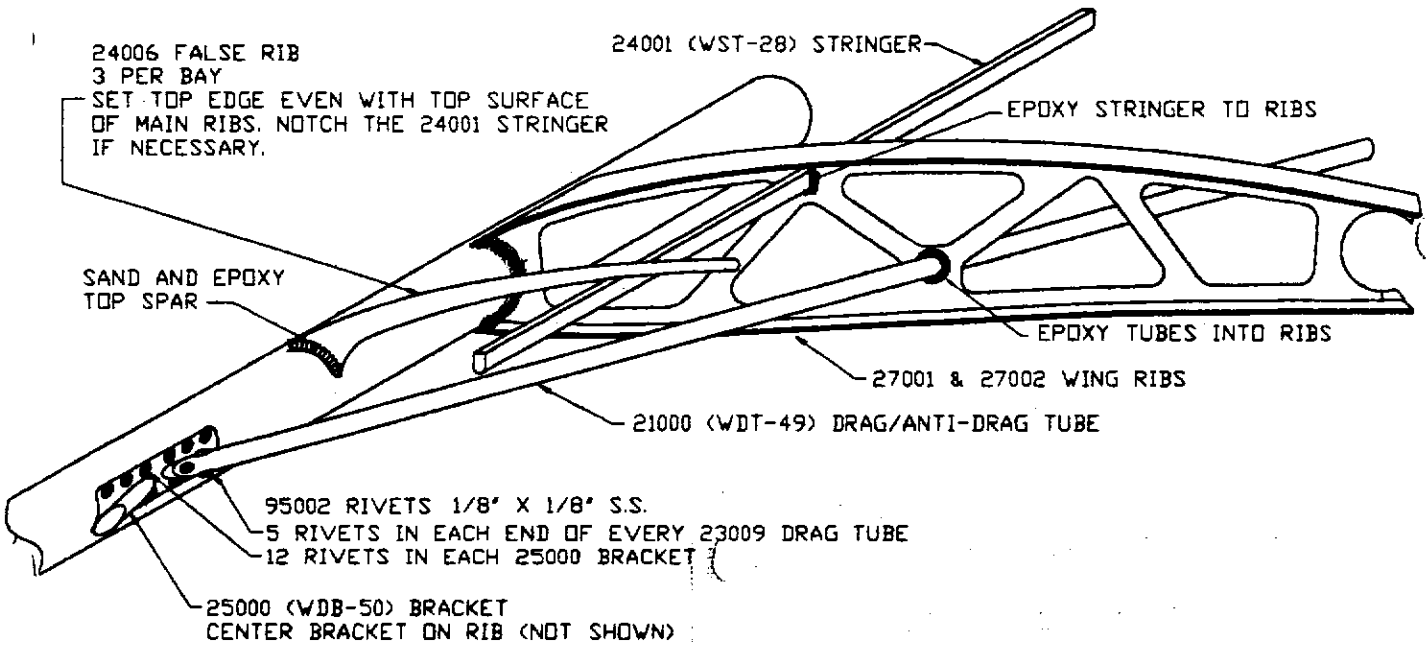

Fig. W-C-2
Stringer, Drag Tube, and False Ribs

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STEP (4): You need to brace the end ribs against the pull of the fabric. Cut the #23009 (WBR-2) Rib Brace material into 13" lengths. Form two "jaw protector" angles from some scrap aluminum or thin sheet metal for use on your vise (see Fig. W-C-3). Make a mark 1/2" in from each end of each 13" length of tubing. Insert one end into the vise to this mark and crimp and bend to 45°. Bend the other end the same. The two flattened surfaces should be perpendicular to the same plane, so the tips of the brace will fit flat against the spar and the ribs.

STEP (5): Drill 2 holes diagonally from one another on the tabs of each brace with a #30 drill. Position, drill, and cleco the braces into place between the ribs and the spars. As shown in Fig. W-C-4. Remove, deburr the rivet holes, rough-sand the mating surfaces, apply structural adhesive and rivet in place. Refer to Plate W-22. Use 1/8" x 3/8" AS rivets through the ribs and 1/8" x 3/16" S.S. rivets into the spars. Use a small washer or small piece of aluminum on the back side of the AS rivets to keep them from pulling through the wood. See Fig. W-C-4 View A-A.

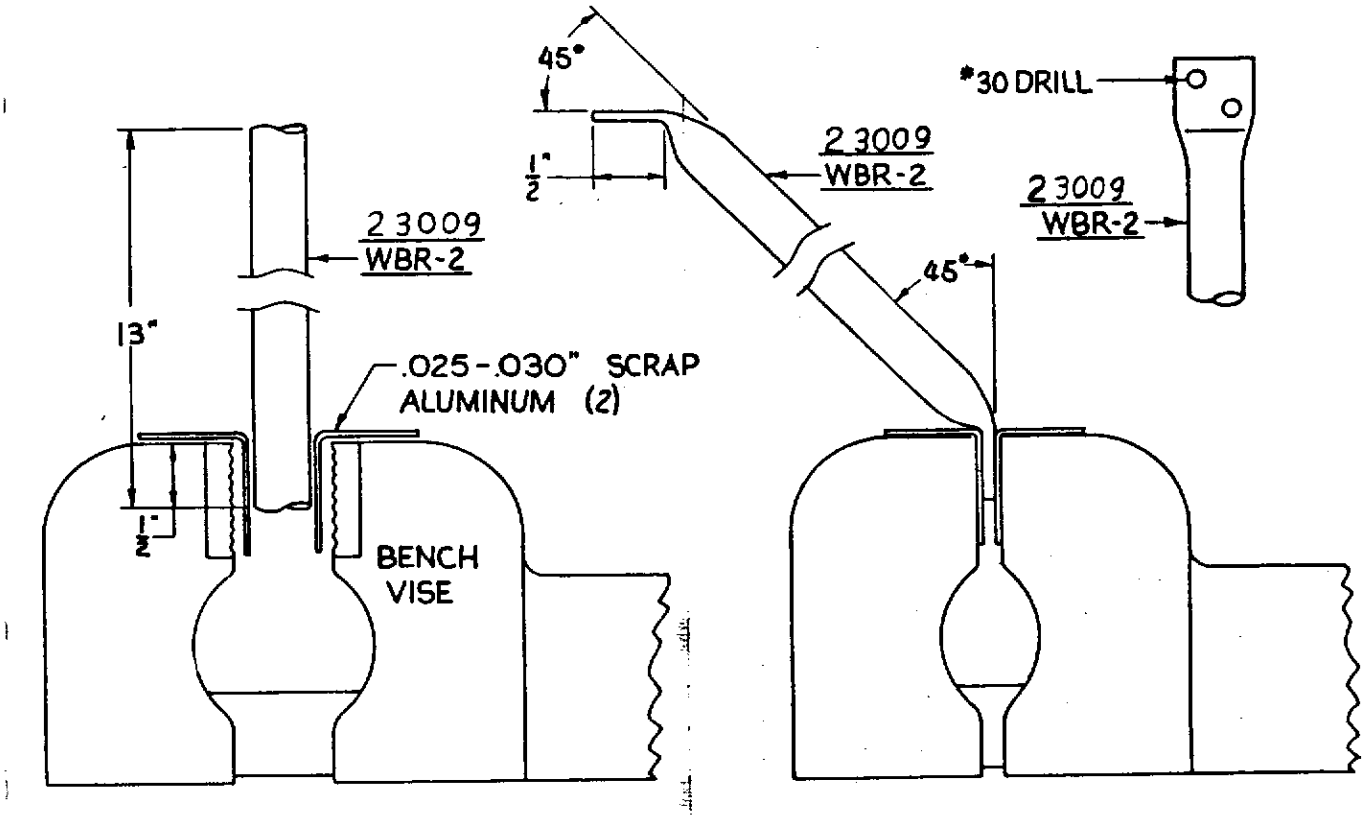
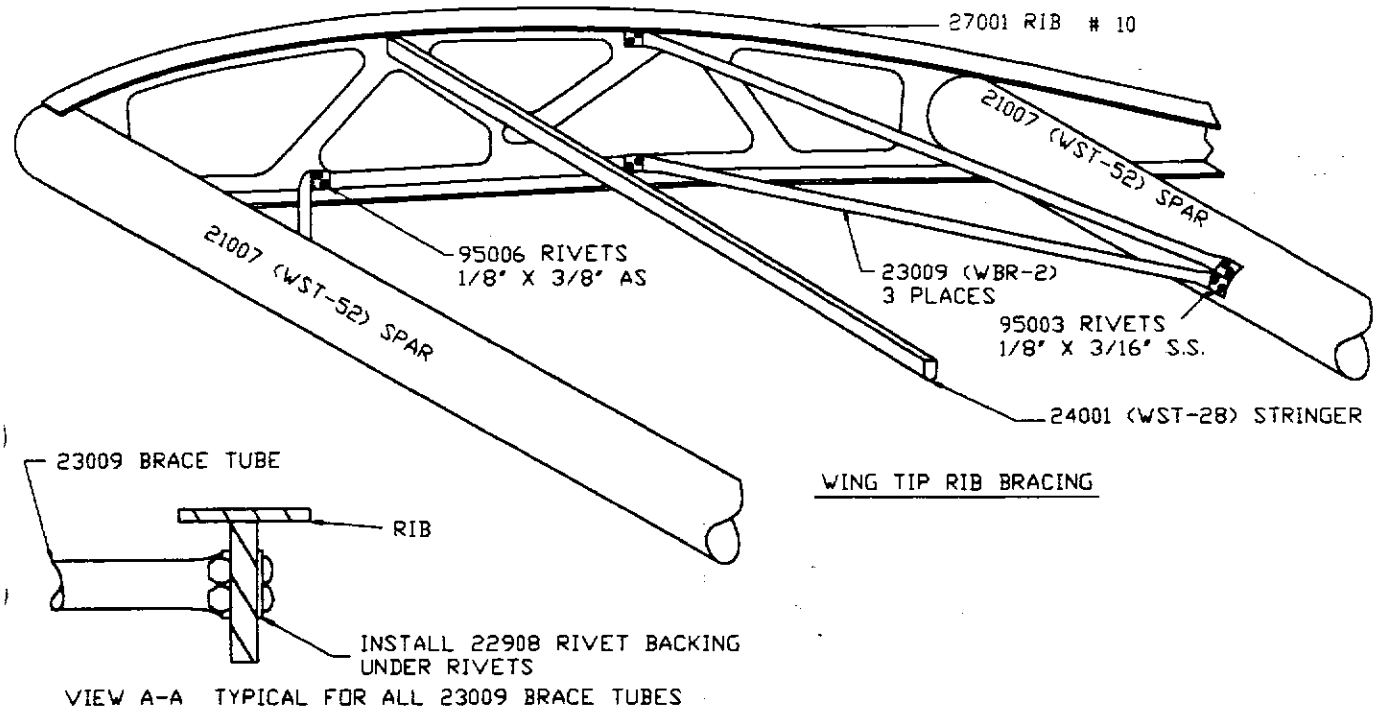


Fig. W-C-3
#23009 (WBR-2) Rib Brace Forming Details

NOTE: IF YOU ARE INSTALLING WING TANKS OR WINGLOCKERS (SEE FIG. W-A-14 THROUGH FIG. W-A-19) CHECK THE RIB BRACE REQUIREMENTS AT THE WING ROOT END.



WING TIP RIB BRACING

VIEW A-A TYPICAL FOR ALL 23009 BRACE TUBES

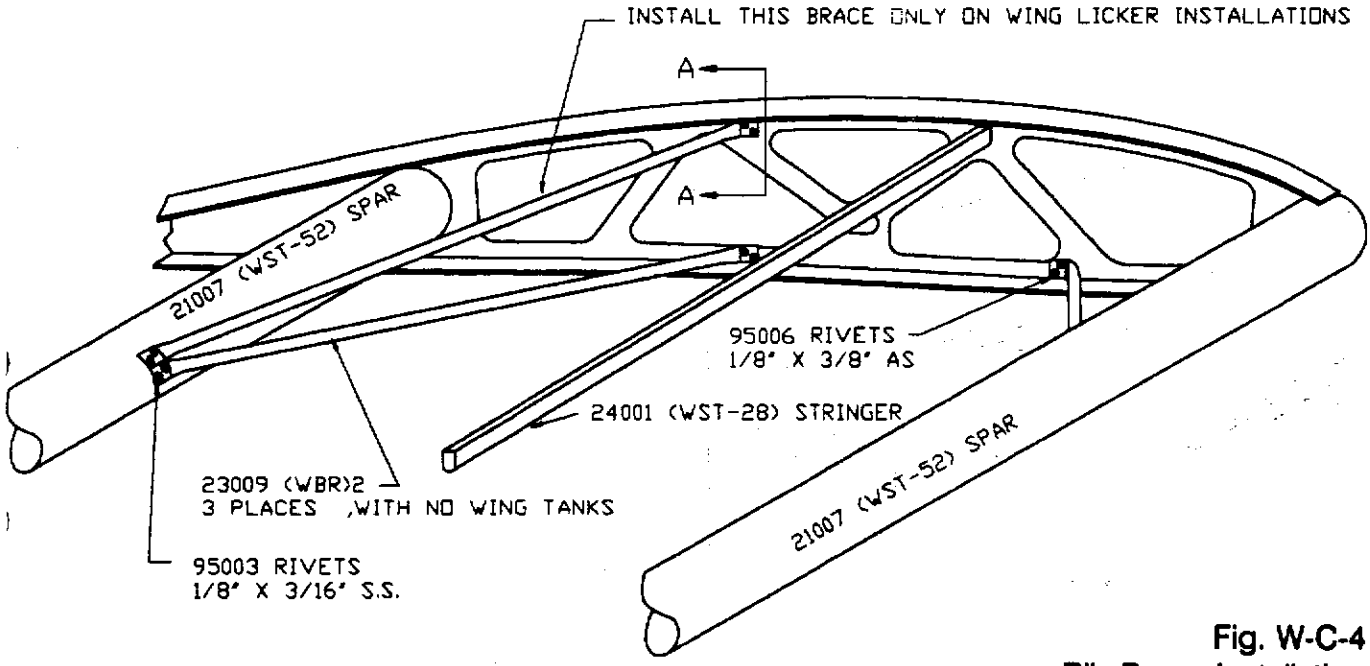


Fig. W-C-4
Rib Brace Installation
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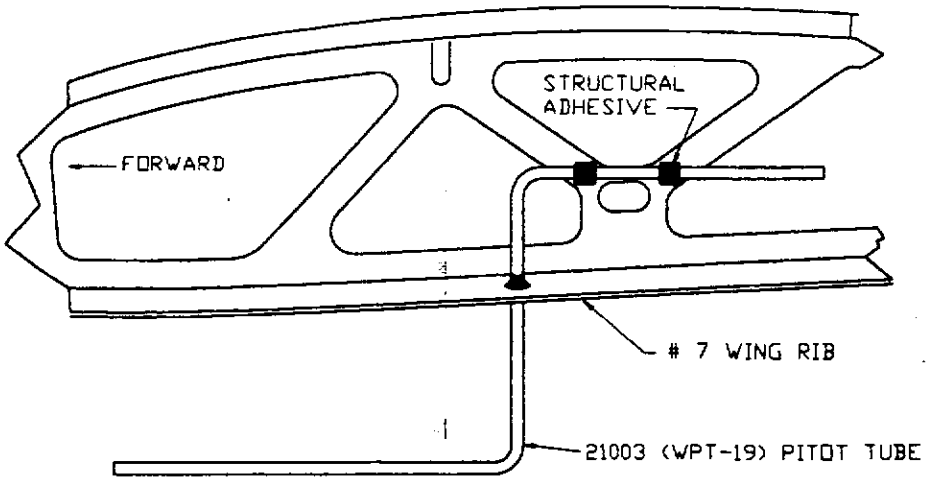
NO WING TANK OR WING LOCKER INSTALLATION SHOWN.

WING ROOT BRACING

NOT NEEDED WITH WING TANKS

STEP (6): Install the #21003 (WPT-19) Pitot Tube. Drill a 1/4" hole through the capstrip on the inboard side of the web of the #7 rib as shown by Fig. W-C-5. Be sure the edge of the hole is exactly next to the rib web. Insert the #21003 Pitot Tube as shown and apply structural adhesive to lock it in place. Take care to point the pitot tube forward.



Pitot Tube Installation Detail
Fig. W-C-5

STEP (7): Drill a 17/64" hole in the forward side of the rear spar approximately half way between rib #5 and #6. Once you have the hole drilled into the side of the spar, while the drill bit is still turning, move the drill motor toward the wing tip end. This will form an oval shaped hole through which you will later pass the #24009 Pitot Tube Line into the spar. You will secure the line in the hole with silicone.

STEP (8): Lightly sand and brush clean the ribs and stringers to prepare them for varnish. Mask the top and bottom capstrips (fabric glue area) of each rib with masking tape. Apply 3 coats of clear polyurethane varnish to all the wood parts in the wings. Spraying these coats on will save weight. Allow to dry between coats. (If you use the Stits Epoxy Varnish, you can varnish the rib capstrips, assuming you plan to cover and finish with Stits products).

STEP (9): Install the #22908 Rivet Backing Strips for the rivets that will attach the wingtips. Trim the strips to fit under each edge of the capstrips on the #10 ribs. Glue them in place with structural adhesive, as shown in Fig. W-C-1. Rough up the aluminum strips with coarse sand paper before applying adhesive.

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STEP (10): Trim the #22906 and #22907 Trailing Edge pieces as shown in Fig W-C-6. The tips of each piece should butt against the tip of the next one on the centerline of the hanger ribs. The outside tips of the trailing edge should fit flush with the outside edges of the root and tip rib capstrips. The "Lip" edge should point up. Cut the notch for the cap strip 1/8" wider on the outboard side of each rib to provide a drain opening for the area behind the lip.

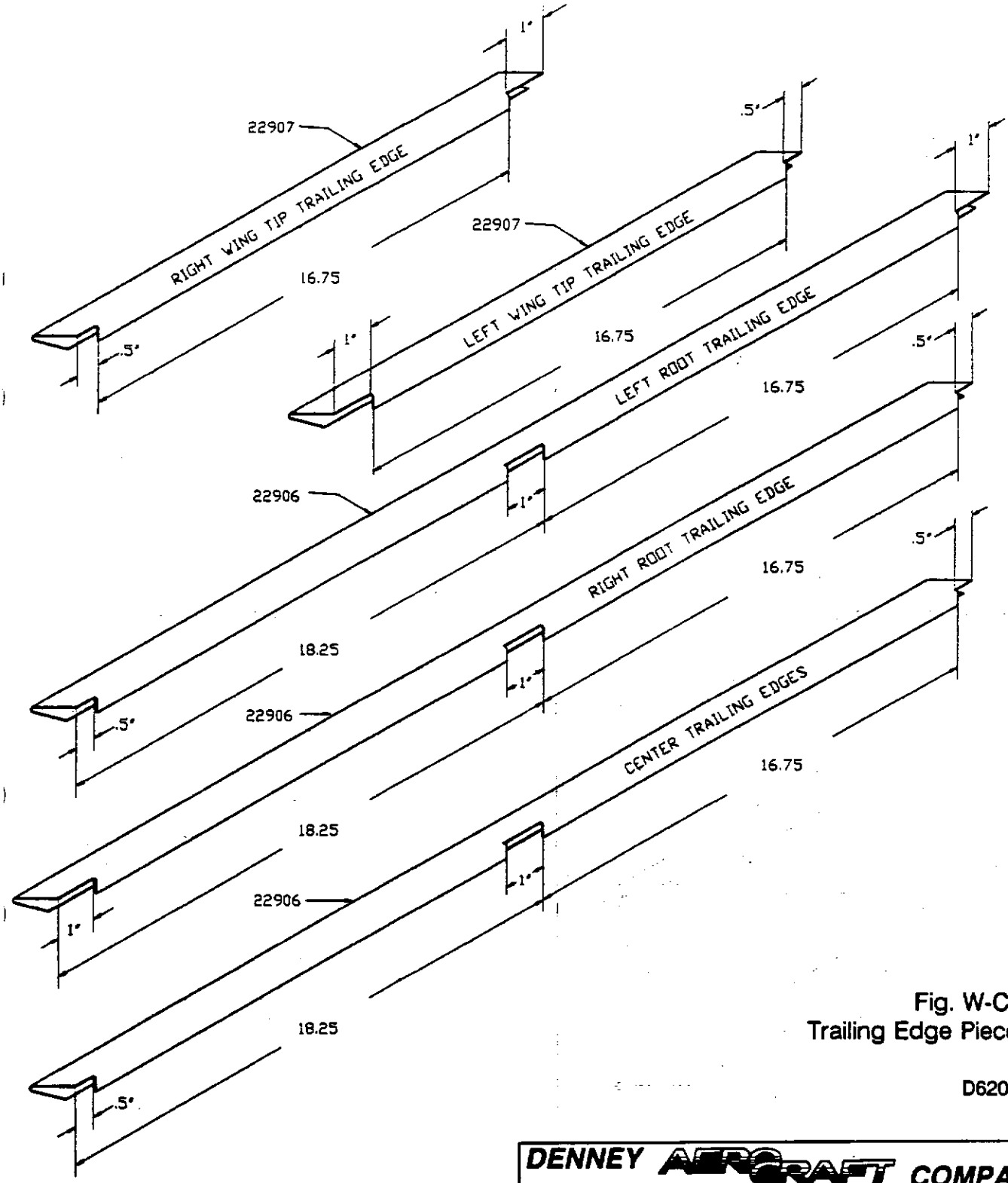

Fig. W-C-6
Trailing Edge Pieces

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T10320 V4.

STEP (11): Fit the Trailing Edge pieces to the wing. You can string a line along the Trailing Edge to help get it straight. Clamp the pieces in place and drill a #40 hole through the pieces and the capstrips, one on the top and one on the bottom of the even-numbered ribs. Remove the pieces and sand all the mating surfaces where they contact the ribs. Also sand the areas on the ribs where glue will be applied. Mix some structural adhesive and glue the trailing edge pieces to the ribs. Trowel a small fillet of glue inside and against the bottom sides where they meet the rib web. Rivet the Trailing Edge pieces to the capstrips of the even-numbered ribs with the **3/32" x 1/8" rivets** and let the structural adhesive set overnight. **Refer to Fig W-C-7.** Then you can file the rivets almost flat so they will barely show under the fabric. Do not install rivets into the flaperon hanger (odd-numbered) ribs. After the wing is covered you will fit the flaperon hanger brackets onto these ribs. Refer to Plate W-27.

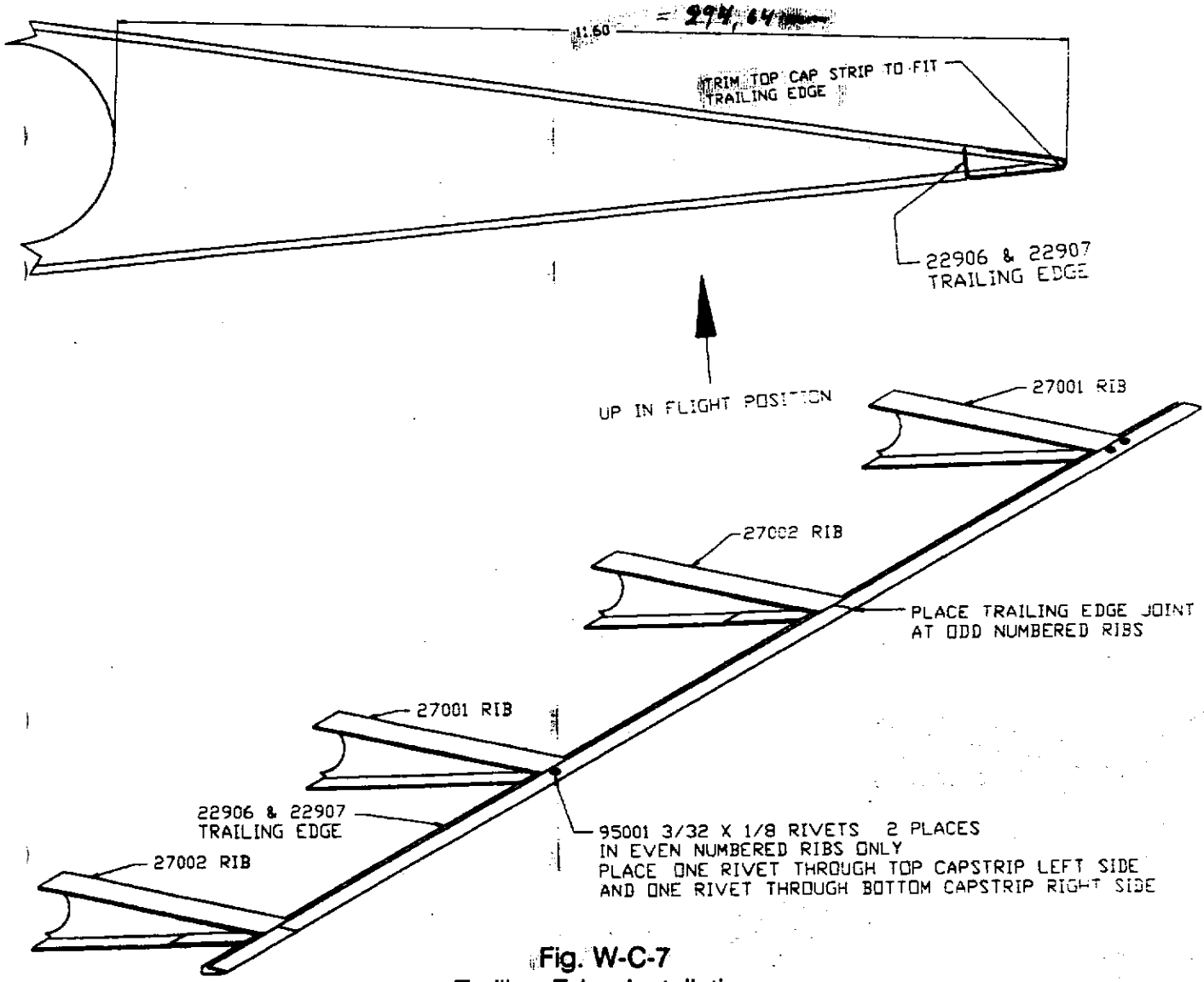

Fig. W-C-7
Trailing Edge Installation

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STEP (12): Set one of the wings upside down on your sawhorses. Remove the jury struts, lift struts and jury strut brackets. Fabricate the two #54019 (WFR-9A's) and two (WFR-9B's) Fabric Reinforcement plates (see Fig. W-C-8). Drill a 3/16" hole at each inside corner and use small hand snips to shape the Plates to fit over the appropriate strut attach brackets. If you have a sheet metal hand nibbler, it will work effectively also. Sand the edges smooth to remove any sharp edges that might cut the fabric. Shape the front Reinforcement Plates so they follow the contour the fabric will take, they should conform to the contour of the fabric, not vice-versa. Set them aside until you are ready to cover. See Plate W-19.

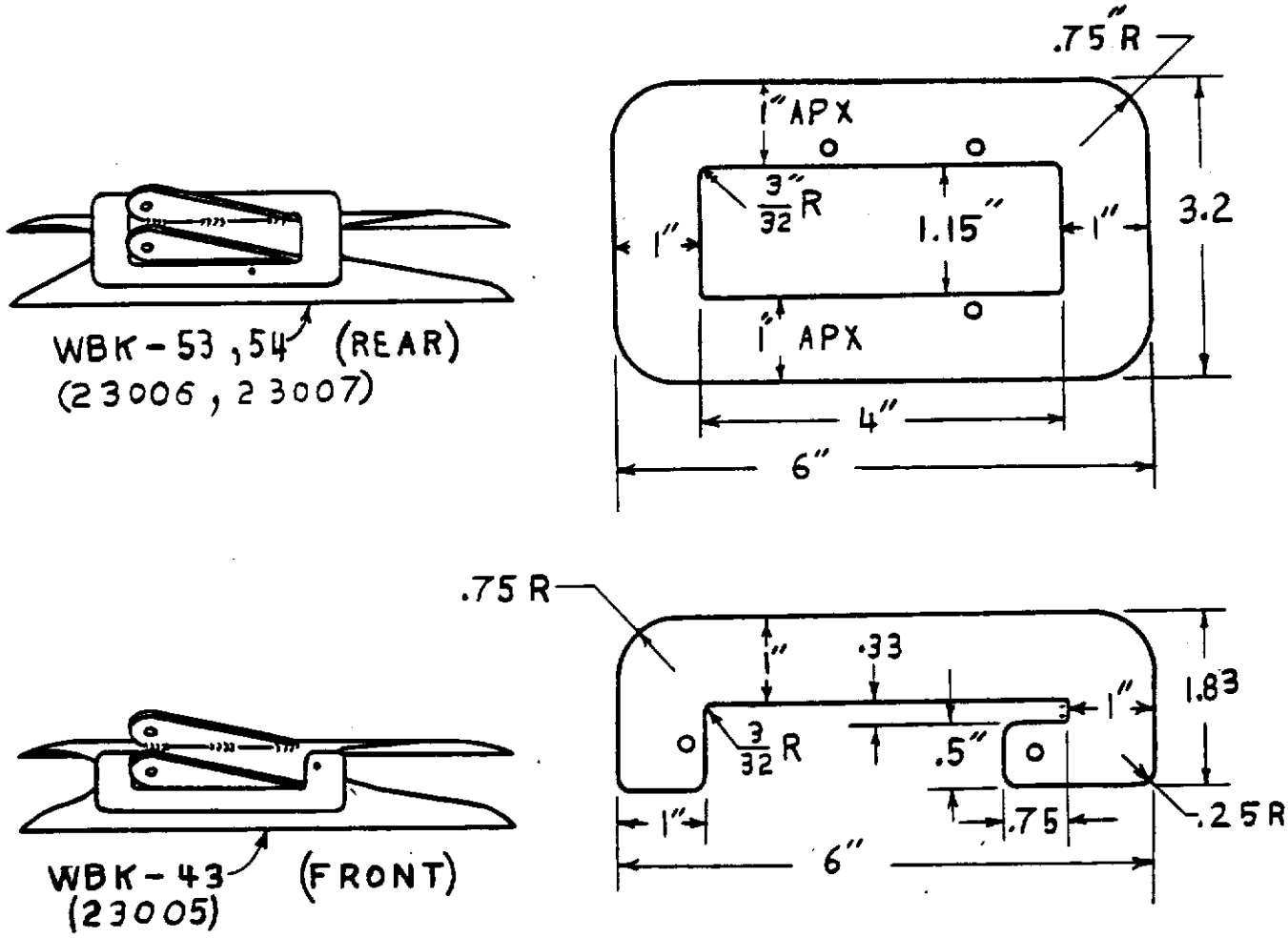

Fig. W-C-8
54019 (WFR9 A&B) Fabric Reinforcement Plates

NOTE: Because of the flexability of the fiberglass wintip, the Model III wing top is also being used on the Model IV wing. there is enough flex to allow for fitting in the laminar style Rib. Once the Rivets are set and the glue is cured there is no difference.

STEP (13): Position the #27014 Wingtip bottom parts under the #27013 upper parts. Note at the bottom of the radius on the leading edge that the joggled edge of the lower part needs to be trimmed and sanded to mate properly with the matching joggle of the upper part. Refer to Plate W-23.

STEP (14): Trim and sand the parts as required. Use small spring clamps to secure the Wingtip parts to the tip rib and tight against the spar. The prescribed line designating the Wingtip's approximate inner edge should align with the inside edge of the last rib capstrip. Drill and cleco the joggled mating surfaces under the leading edge in 4 or 5 places. Refer to Plate W-24.

STEP (15): Temporarily clamp the "drooped" edges together. Refer to Plate W-24. When the Wingtip is in position, mark a line on its trailing edge to match the #22907 Trailing Edge. In other words, prepare to cut the excess material off the Wingtip trailing edge to make a continuation of the wing Trailing Edge. As you fit the Wingtip sight down the spar to ensure a straight line continuation of the spar through the Wingtip.

STEP (16): While the Wingtip is still clamped in position, mark a 1" square to be cut out of the aft, inboard corner of the Wingtip material (see Fig. W-C-9). Then you can make a smooth butt-joint of the Wingtip against the end of the Trailing Edge, instead of a thick lap joint.

STEP (17): To make a nice smooth line over the front spar, you may have to cut another square notch out of the top piece at the bottom of the spar. This will allow the front edge of the bottom piece to fit tight against the spar. The leading edge portion can also be reshaped if neccessary by warming with a heat gun.

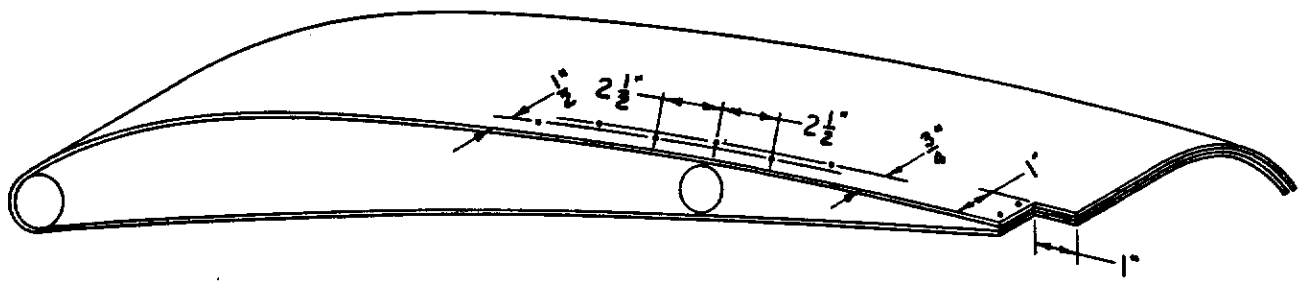

Fig. W-C-9
Wing Tip Details

STEP (18): Remove the Wingtip parts and trim the trailing edges, the inboard edges and the 1" square cut-outs. You may also have to trim the drooped edge. Sand the edges.

STEP (19): Clamp the pieces back on the tip rib and square it up properly. Lay out the 2 1/2" rivet spacing, on the inboard side of the capstrip. Drill and cleco the wing tip to the rib, starting at the leading edge and working aft to prevent buckling. refer to Plate W-22.

STEP (20): Remove the Wingtip parts and clean off any residual mold-release wax or PVA film, first with mild soapy water then with acetone.

STEP (21): Sand the mating edges of the top and bottom halves with 80-100 grit sandpaper to provide good tooth adhesion in the areas to be glued.

STEP (22): Position the parts back on the end rib and glue the joggled edge, the drooped edges and the trailing edges together using structural adhesive or polyester fiberglass resin with flox or chopped glass as a thickener. Clamp the long, straight "drooped" edge between metal or wood straight-edges, or it will end up crooked and look terrible. The trailing edge should also be clamped to ensure a straight-line continuation of the wing trailing edge from an "aft, looking forward" point of view. Refer to Plate W-24.

STEP (23): Remove the clecos from the joggled edge after the structural adhesive has set. Patch the holes and any flaws or cracks with "Bondo" or structural adhesive and sand smooth before painting.

STEP (24): Rough-sand and clean the tip rib capstrip and the mating edge of the wingtip. Apply structural adhesive and rivet the wingtip in place on the tip rib with 1/8" x 1/4" SS rivets.

NOTE: Alternatively, some builders elect to cover the wing first, then attach the wingip with screws or rivets. Some install plate nuts on the tip rib capstrip so the wingtip can be easily removed.

STEP (25): Glue the supplied leading edge template to a small sheet of aluminum or plywood. See Fig. W-C-10.

STEP (26): Carefully cut along the line of the template.

STEP (27): Trim the #24019 Leading Edge to fit over the lift strut attach brackets if necessary. You can extend the leading edge past the spar to the windshield if you want. Trim it to fit against the windshield.

STEP (28): Rough sand and clean the concave surface ot the Leading Edge and the spar where it will attach. Butt the outer end of the Leading Edge extrusion up to the wingtip.

STEP (29): Apply structural adhesive to the Leading Edge and attach it to the spar. Use the template to conform the Leading Edge properly to the spar and the ribs. Refer to Plates W-29, W-30, and W-31.

STEP (30): Tape the leading edge securely in place until the adhesive sets.

STEP (31): Use a piece of Clark foam or a piece of the CF-50 Foam supplied with the Cover and Finish Kit to form a smooth fairing from the end of the extruded Leading Edge onto the wingtip. If you use Clark foam you can bond it and seal it with polyester resin. If you use the CF-50 (Styrofoam) you will have to bond it and seal it with structural epoxy. Polyester resin is not compatable with styrofoam.

STEP (32): If you live in a humid and/or salt air climate, you should spray Stits Epoxy Chromate Primer or another high-quality primer on all the steel and aluminum surfaces that are not already painted or plated. Clean with acetone, MEK, or Metal-Prep and sand lightly before applying primer.

STEP (33): Very carefully examine the wings to be sure they are complete, smooth, varnished, painted, etc. before you cover. Refer to the Fabric Covering section of the manual and to the Stits Poly-Fiber Covering and Painting Manual for directions. The wings are required to be covered before proceeding with the Flaperon Sub-Section.

Fig. W-C-10

LEADING EDGE TEMPLATE

DENNEY AIRCRAFT COMPANY

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