

FIGURE -Mounting blocks for rudder pedal assembly

The bolts mounting the two blocks on the left (pilot side) will also mount the brackets for the brake master cylinders. Fabricate these brackets from 1/8-inch thick aluminum angle supplied with the kit. The smaller bracket will be installed on the left side for the left toe brake, and the larger (wider) angle will be used for the right toe brake. Use the drawing below to fabricate the brackets, using the respective rudder mounting blocks as drill jigs to assure proper fit through the bolt holes.

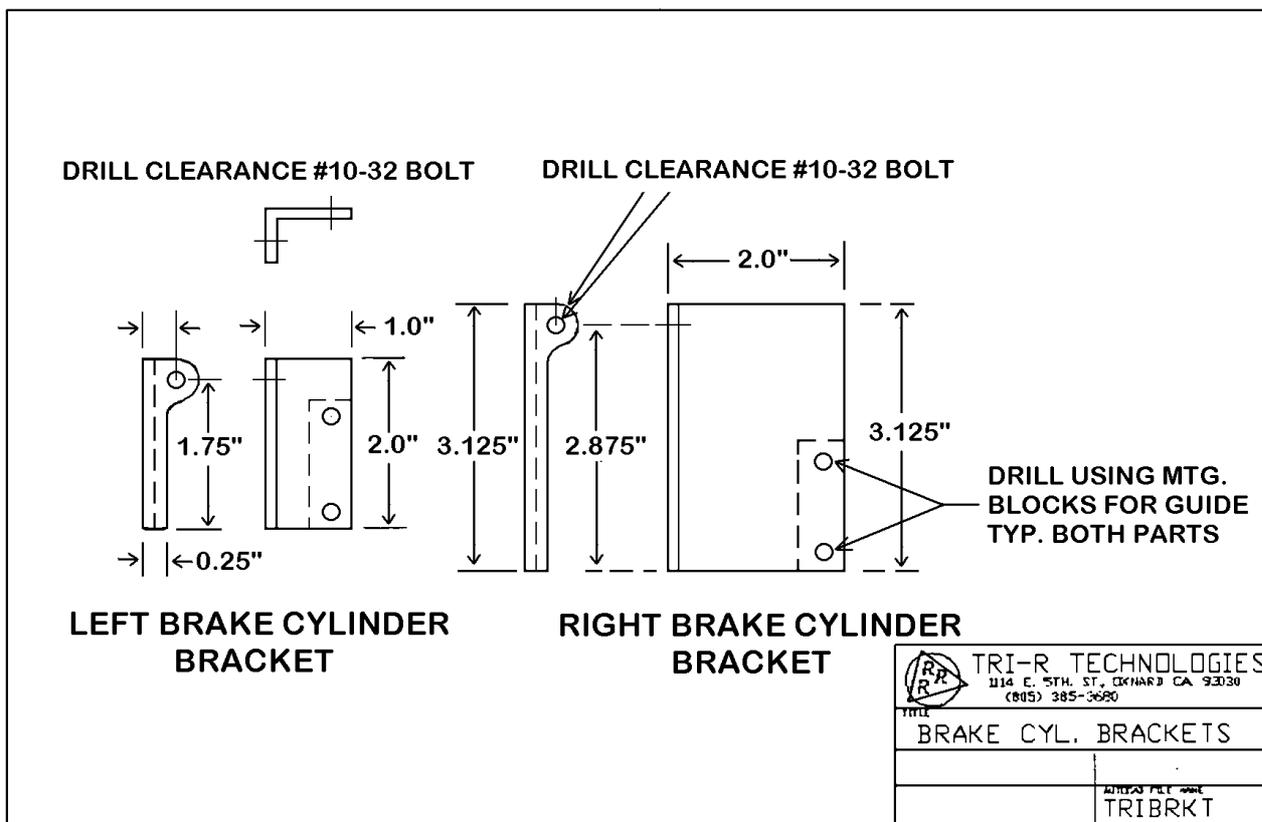


FIGURE - Brake master cylinder mounting brackets

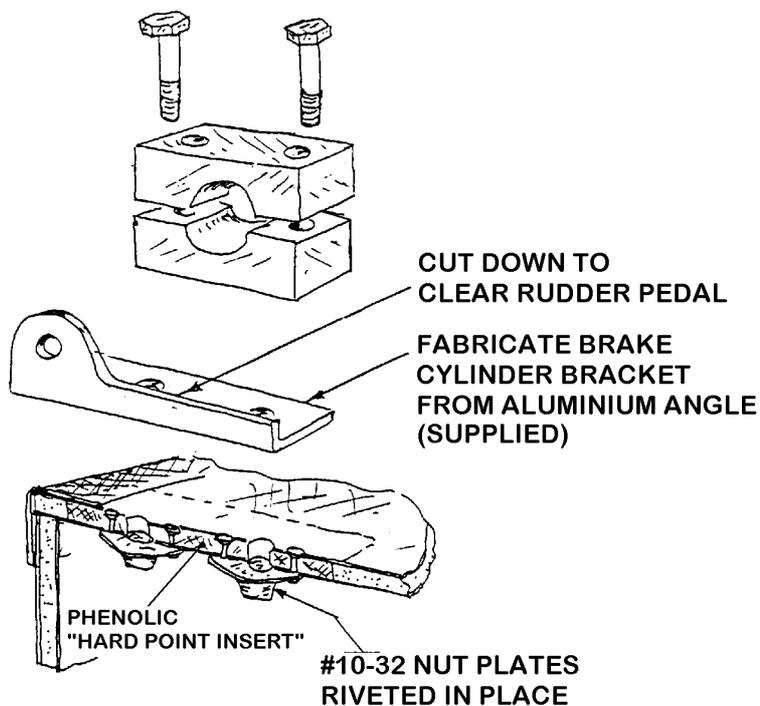


FIGURE - Installation of nut plates for rudder pedal mounting

Position the blocks on the floor panel (with the hard points installed), using either the rudder assemblies, or other sections of $\frac{3}{4}$ inch tubing, and use the blocks as drill jigs for the eight attach bolts (#10 - 32 hex head screws ___ inches long (AN 3- ___). Use the attach bolts to hold the nut plates in position, and drill for the $\frac{3}{32}$ inch rivets which will be used to attach the nut plates. Rivet the nut plates in position as shown in the preceding sketch.

Temporarily install the bearing blocks for the rudder pedal assembly, with the brake cylinder mounting angles on the pilot side, and the pedal assembly for fit and functional testing.

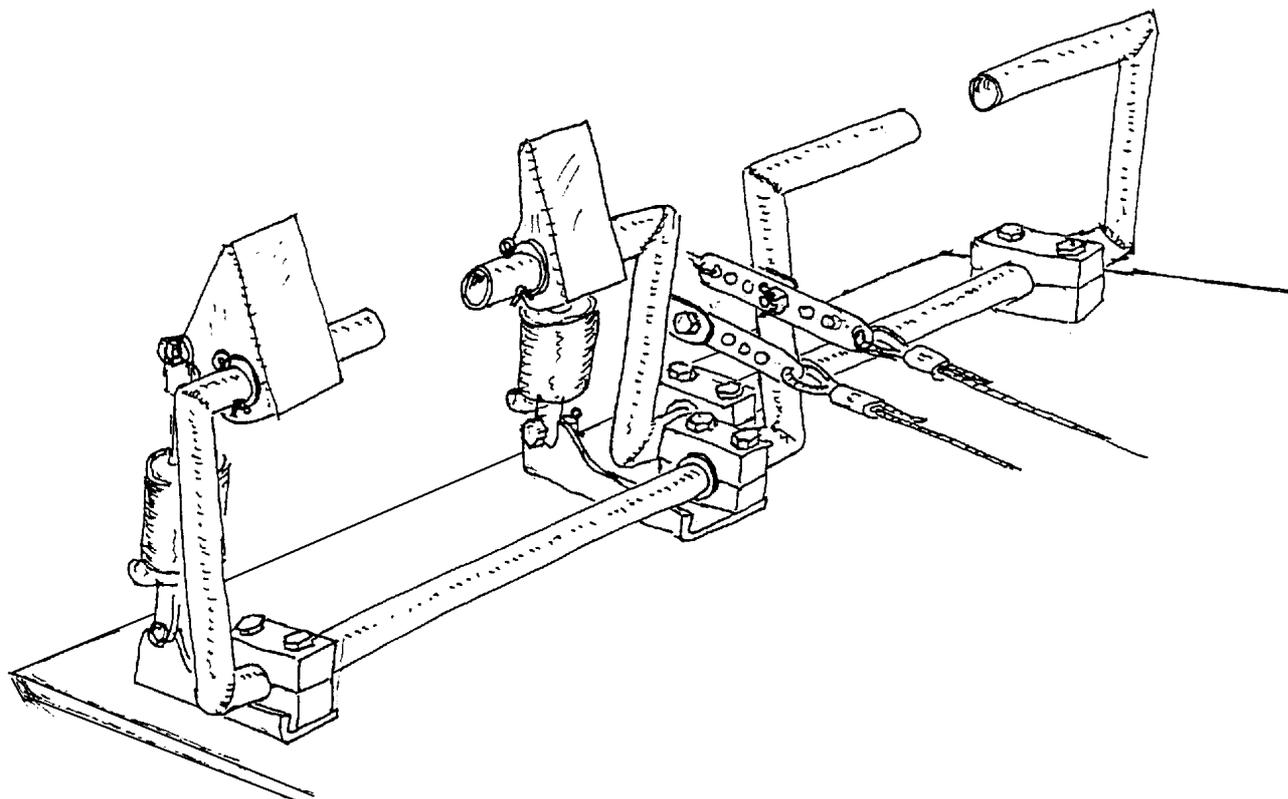


FIGURE - Rudder and brake system assembly

A “U” shaped cutout roughly 1-inch square must be provided on both the front and rear panels of the floorboard assembly. These cutouts provide for the passage of the fuel, brake, and other lines or wires between the spar box and the firewall area. Attach the end panels to the floorboard assembly with 2-inch wide 2 ply BID at the corners, and fit the assembly to the fuselage inner surface.

The location shown in the drawing is the nominal value used in the prototype. If the anticipated pilots are taller, or shorter, the location of this floor section can be adjusted to provide the desired distance between seats and the nominal rudder pedal location. When located in the desired position, bond the floor assembly into place with 2-inch wide two ply BID tape.

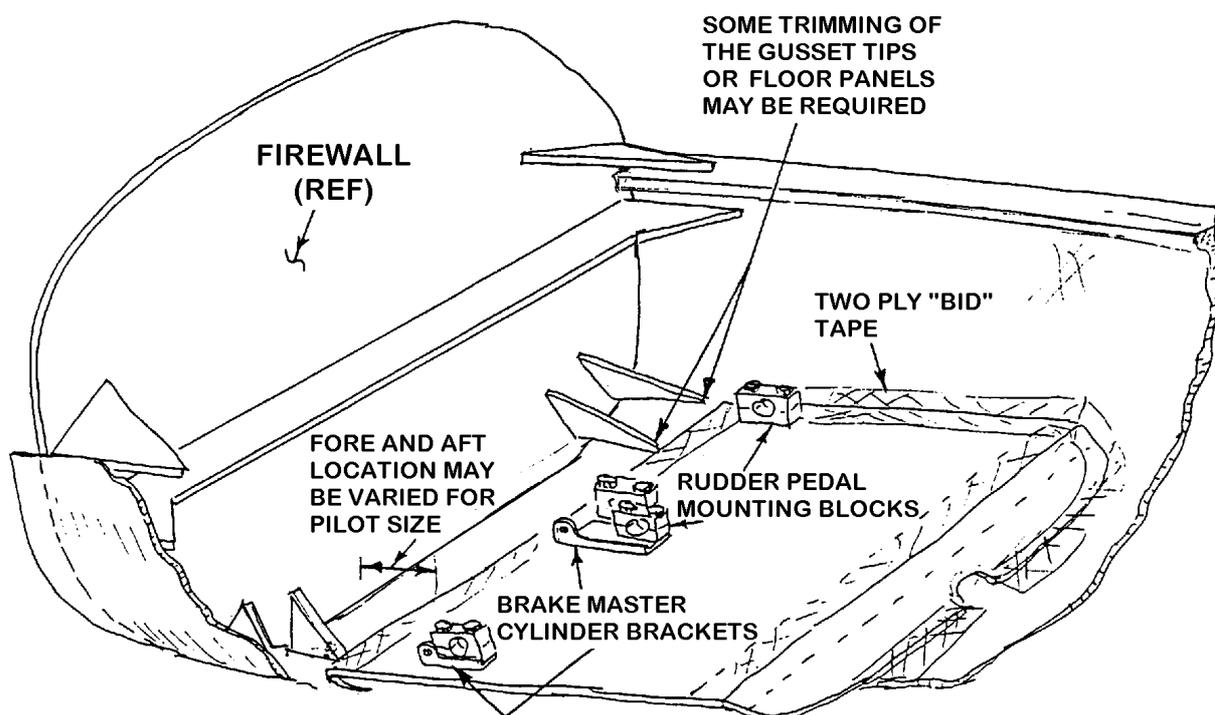


FIGURE - Floor assembly position and installation

HARD POINT FOR THE PUSHROD BELLCRANK

A hard point to be installed in the lower fuselage shell is for the bellcrank for the elevator push-pull rod. The desired routing of the elevator push-pull rod, and the rather extreme length of this rod assembly suggests the value of a two piece push-pull rod assembly, with an idler bellcrank located behind the seat assembly. This idler assembly will stabilize the long push-pull rod, and allow the path to be broken into two sections with a good stabilizing point near mid span. This idler bellcrank also establish the desired ratio of elevator travel relative to stick travel. The bell crank slightly amplifies the travel by setting the shorter leg of the idler on the forward side hooking into the stick push rod. The longer, aft arm of the linkage hooks to the push rod leading to the elevator control arm. The kit supplies high quality rod ends for these joints to minimize friction and end play in the linkage.

Locate the longitudinal centerline in the bottom of the fuselage shell, and the STA. 125 location, and mark this location. Mark out a 4-inch by 4-inch square centered on this location and cut away the inner skin to these marks. Establish a hard point as directed in the procedures, cutting away the core material with out damaging the outer skin. Cut a piece of ¼ inch phenolic to fit this opening, and prepare all surfaces for bonding per the procedures. Bond the phenolic in place and fill voids with MICRO paste. Close out the area with a two-layer bid patch with at least 2-inch overlap all around the cut out area.

IDLER BELL CRANK

Locate the two idler bell crank stampings in the kit (KS-31), and the two flanged bearing assemblies (AN218-4). Install these flanged bearing assemblies in the large hole in the bell crank. Slight reaming or scraping with a pocket knife or file might be required to make sure the bearing fits properly in place. Make a right and a left hand of both these idler arm stampings, using the supplied rivets to attach the flanged bearings to the respective sides of the two idler arms. Use the rod ends from the push rods and the specified washers to establish spacing between the two idler halves. Locate the idler arm mounting angles and use them to aid in drilling the mounting holes (4) for this assembly. Countersink these holes from the outside of the fuselage bottom and install the assembly using the 4 flat head #10 - 32 screws supplied (MS24694-S56). (See figure as guide for these operations.). Four countersunk washers (A315-017-24A) are also supplied for the flat head bolts selected for the idler mounting area to minimize "fretting erosion" of the composite material.

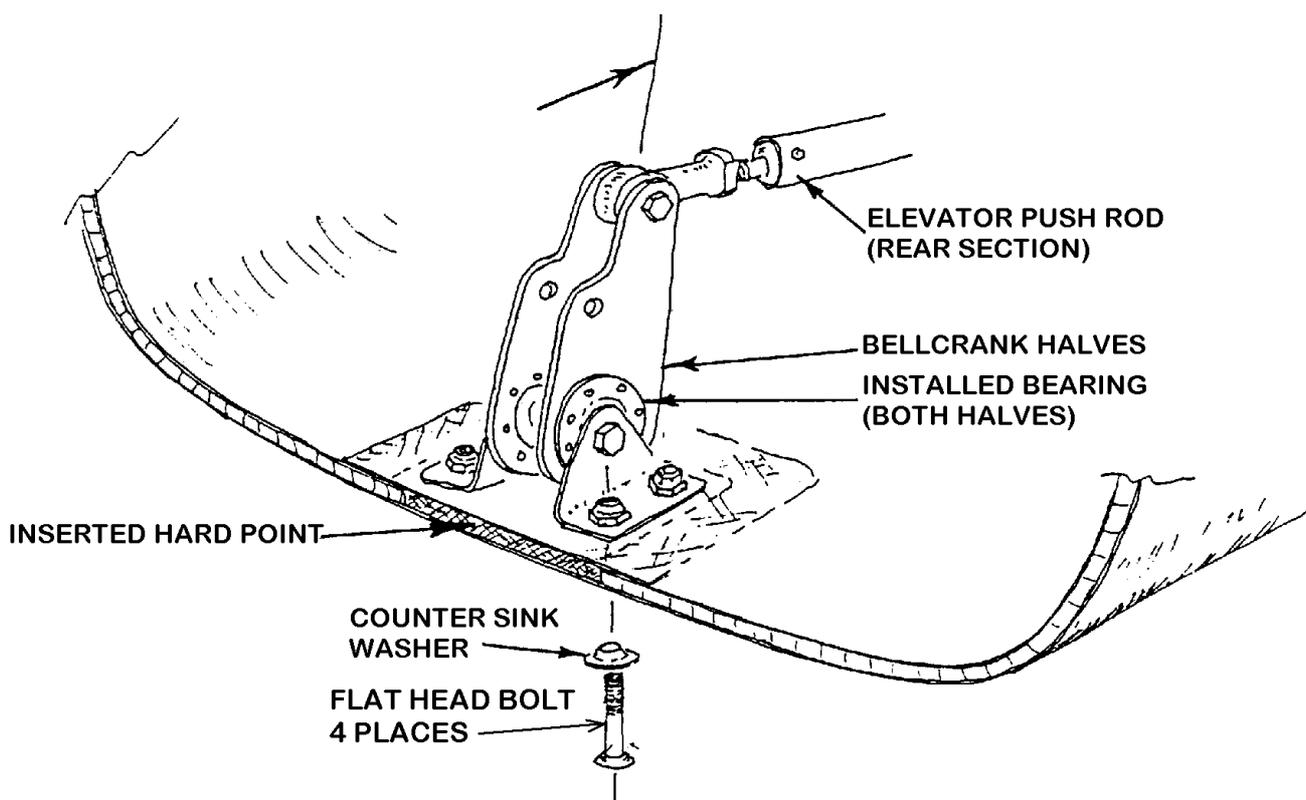


FIGURE - Elevator push/pull rod idler assembly mounting

SEAT BACK ASSEMBLY

The seat back assembly is constructed from the two ply pre-preg panel material supplied with the kit. Two pieces are required, the first being the seat back panel, and a relatively narrow section that is attached to the top of the seat back panel for stiffening. Cut the seat back panel, and the top stiffening strip, from the supplied two ply panel using the supplied outline drawing. The seat back panel attaches to the upper edge of the rear spar, and angles back such that the top, forward, edge is located at sta. 93.5 (or 61.5 inches aft of the firewall). It is recommended that the top section of the seat back be marked and set aside for later installation. This will provide better access for other assembly work that will be accomplished in this area.

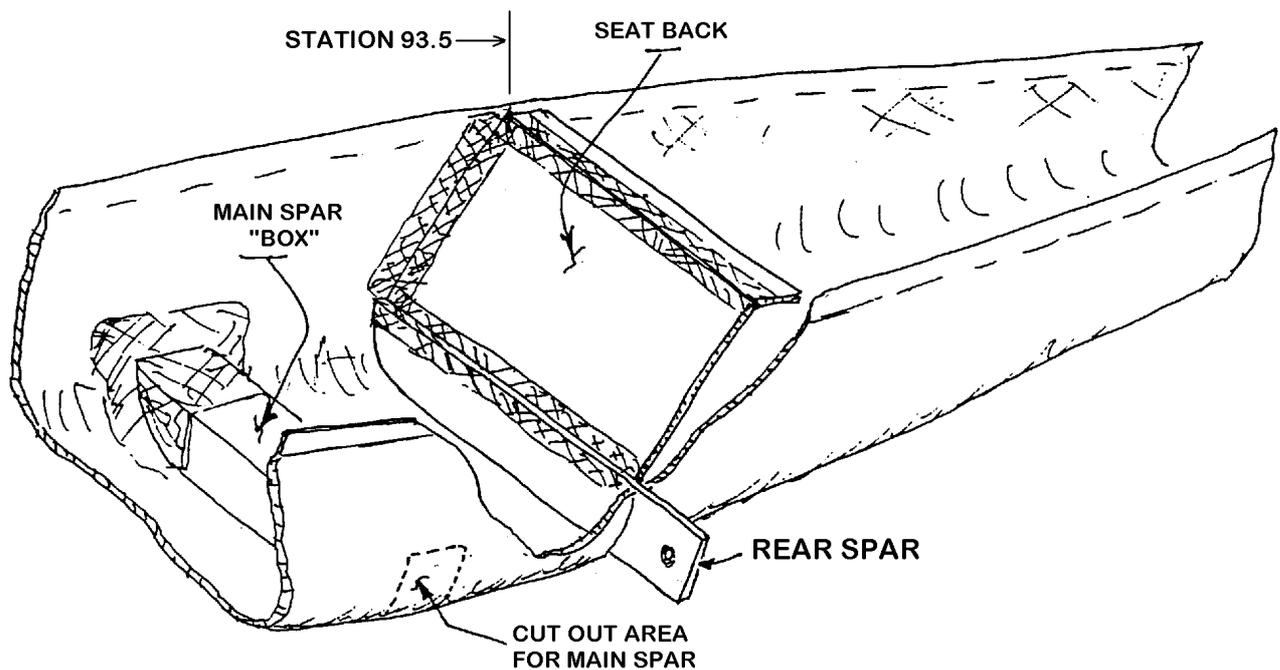


FIGURE - Installation of seat back

“Tack” the seat back in place with 5-minute epoxy, and verify the location while the epoxy cures. When the position has been established to your satisfaction, bond the assembly in place with 3 inch wide 2 ply BID. (see figure) The final bonding of the top surface must be delayed until the fuselage top is attached, since these plies will overlap onto that assembly.

TAIL POST

The tail post should be cut to shape from a portion of the included 2-ply pre-preg panel. The pattern for this component should be marked on the appropriate panel of pre-preg. Use a “dry fit” assembly procedure, and trim the cutout for proper fit with the lower fuselage half at the appropriate location. Monitor the fuselage width at this point, such that there will be sufficient clearance for the elevator bell crank and push rod. Position the part vertically in both planes with the forward face at station 208.5 and bond it to the lower fuselage molding with 3 ply BID on the front side only (rear side bonding will be accomplished as the vertical fin halves are bonded in place). Proper alignment of this component is critical to the trim and flight characteristics of the completed aircraft, so perform this leveling with care.

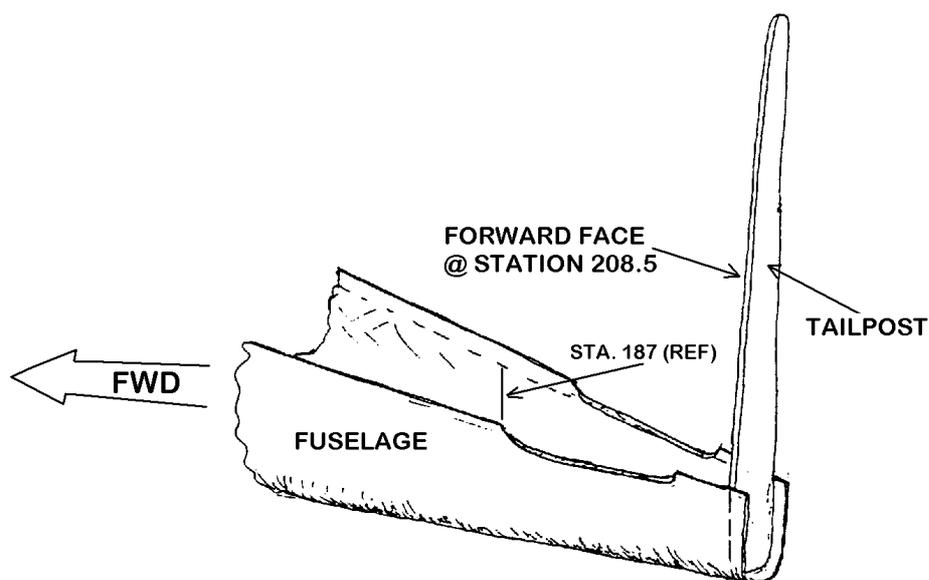


FIGURE - Tailpost installation

HORIZONTAL STABILIZER

Locate the template for the horizontal stabilizer airfoil, and use this template to make a slightly oversized cut out on the upper edge of the fuselage bottom molding as shown in the next figure. The hinge line will be located at STA.205. This cut is slightly oversized to permit leveling the stabilizer from side to side, and establishing design incidence value. Prepare both the horizontal stabilizer, and the fuselage surfaces adjacent to the cut out, for bonding (clean and roughen those surfaces that will be bonded in with BID tape as described in the procedures section). Use small pieces of wood to shim the stabilizer into desired location which includes setting the hinge line at station 205 (173 inches aft of the firewall station 32), centered, and level from side to side, and 0 degrees of incidence relative to the fuselage waterline level. The chord line of the symmetrical horizontal airfoil section should nominally be set at the 40 inch Waterline station (in line with the top edge of the bottom fuselage section). this dimension is less critical than the requirement to set the assembly level and square with the fuselage section. When these measurements are satisfied, fill the major portions of the gap between the stabilizer and the oversized cut out with a relatively dry "MICRO" mix. Allow this MICRO to cure, and then trim away excess (including any ends of wood sticking out). Prepare the stabilizer surfaces and the inner and outer adjacent fuselage surfaces for bonding. Clean and abrade all areas which will be covered and remove any loose material. Then build a radius (about ¼ to ½ inch radius reactively dry MICRO between the fuselage sides and the lower surface of the stabilizer. This bonding will be done both inside and out, so the station 189.5 bulkhead should be removed or adjusted for these steps, (which is why it was only temporarily tacked in place with 5-minute epoxy). Apply 4 layers of BID pre-lam on both inside and out of the fuselage and the stabilizer with a minimum of 3 inches of overlap. Stagger the width of the overlap on the outside surfaces (those areas which will be visible and subject to aerodynamic drag in the finished plane) to minimize the amount of smoothing in these areas for the final finishing of the airplane.

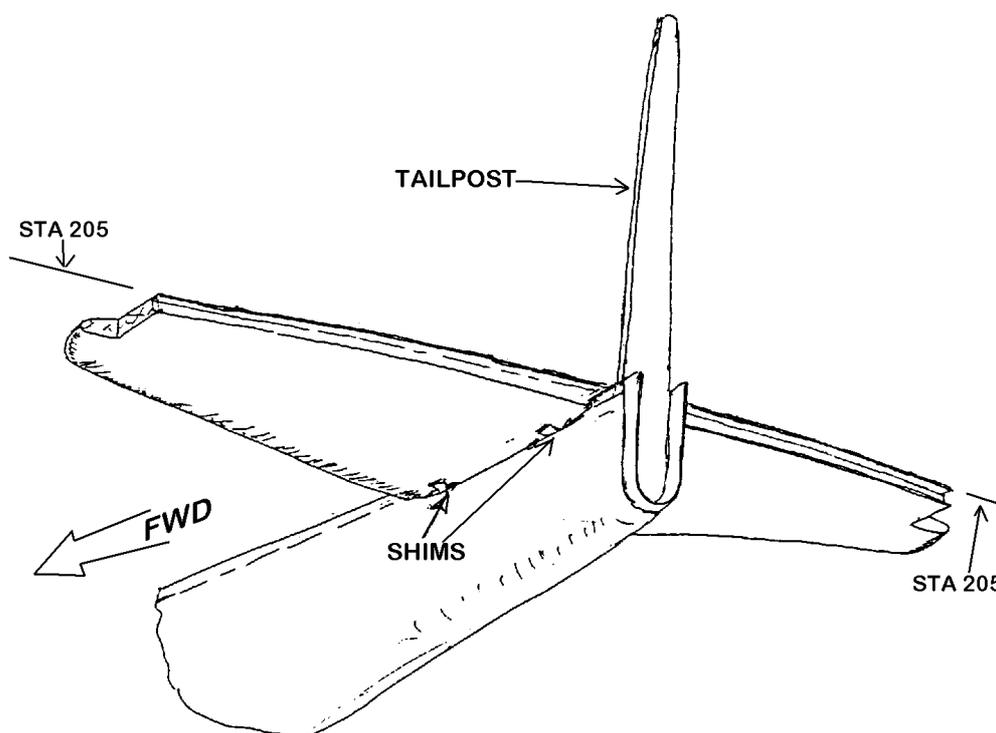


FIGURE - Horizontal stabiliser installation

Replace the station 189.5 bulkhead, cleaning away any residue from the other operations. Position this bulkhead carefully, and bond in place with 2 inch wide 2 ply pre-wetted BID, on both sides (work through the hole in the bulkhead to place the back side BID layers).

STICK LINKAGE ASSEMBLY

The stick linkage assembly process is started by positioning the stick bar assembly up against the rear face of the spar box, and using the mounting brackets as templates, drill the two bolt holes through the spar box material at each position point. Make sure that this location agrees with the recesses on the inner skin of the spar box. This is followed by through bolting the two stick pivot brackets to the aft face of the main spar box, using the previously drilled holes, using the four AN3-4A bolts and associated nuts and washers supplied in the kit.

The assistance of a co-worker would be valuable at this point since this will involve reaching up inside the sparbox from outside the plane, and inserting the two bolts for each location through the proper holes from inside the spar box with the bolt head and a washer inside the spar box. The previously fabricated recess areas should provide a web of solid glass laminate for the bolts, and the recess will allow the installation of the spar without interference of these bolt heads.

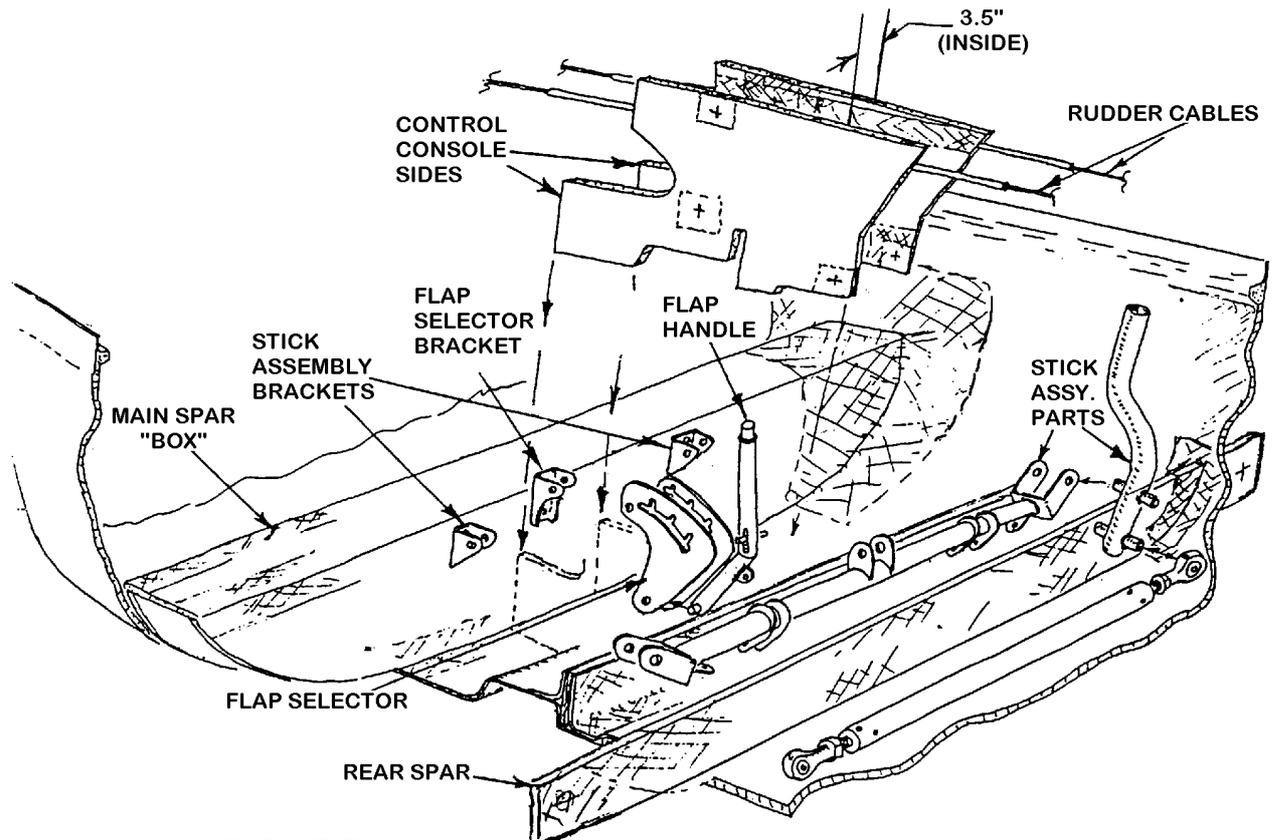


FIGURE - Control linkage and console components

FLAP HANDLE ASSEMBLY BRACKET

This would also be a good time to install the other bracket for the flap actuation linkage and lever sector plate assembly. Use the flap sector stampings to mock up the vertical location for this bracket. With the stick actuation tube assembly installed to its mounting brackets, cycle this assembly to determine clearance with the flap sector. The flap handle assembly mounting bracket will project up above the spar box, and the upper hole will not be usable for mounting. Use the lower hole as a jig and drill the lower bolt hole in the spar box for initial mounting. With the bracket mounted by this bolt verify the uppermost position for the second bolt and drill through both the bracket and the spar box with a clearance diameter for a #10-32 bolt (13/64 or similar size). Mount the bracket with the supplied bolts, nuts and washers (the flap handle assembly requires the console sides for installation and will be set aside at this time).

CONTROL CONSOLE SEAT AREA

Many of the control functions are mounted to -and/or routed through the “console” which has the form of a “tunnel” that is boxed up between the two seat areas. This console is made up from 2 ply pre-preg panel. The outline of these sides is marked on the proper panel section, along with the locations for hard points, and a glass to glass section. Test fit these two panel sections into the location shown, and do any fine trimming which may be required for a proper fit.

A groove will be cut on the inner surface of each side, where a plastic tubing section will be bonded in to carry the rudder cables through this area with low friction and protected from damage or jamming. The location of this channel will also be marked on the console template. Verify that this line will just clear the upper surface of the main spar box, and is directed in a straight line which will project aft to the level of the rudder horn. Cut away a

strip of the inner skin about ¼ inch wide, and remove core material in this path. Fit the supplied lengths of nylon tubing into these grooves and bond in place with thick MICRO paste. Close out the open face with a 1-inch strip of 2-ply BID. Several “hard points” should be installed in each panel side, two for mounting bolts for the flap lever quadrant, and one glass to glass location for one end of the lap belt on each seat. Use the procedure outlined in the procedures section, and use segments of the ¼ inch aircraft plywood for the core fillers. See the previous figure and templates for the size and locations of these “hard points”. In the specified glass to glass area, remove core material from the inside side, and apply a 2 layer BID patch with a minimum of 1 inch overlap to the uncut area around the cut out. The hard point on the lower rear corner of each of the console sides is for one end of the seat belt, and thus is a critical item. This area should be covered with 8 layers of BID. Make sure that each layer has a minimum overlap on all three surfaces of 2 inches. A tapered overlap will spread the load more evenly and present a better appearance if neatly accomplished. The 2 inch overlap is MINIMUM for any layer.

ELEVATOR PUSH PULL ROD INSTALLATION

When the bonding of the horizontal stabilizer is secure, trim away just enough material aft of the horizontal to allow assembly of the elevator. A 1½-inch hole, lined up with the hole in the elevator horn is all that is required on the right side of the fuselage. A larger cut out is made on the left (pilot) side, to permit access for hooking up the elevator push rod. See the assembly section for proper tube sizes, adapters and rod ends for the elevator push pull assemblies. Install the elevator, and hook up the long push rod (tube) to the elevator horn on one end, and the upper position of the idler bell crank for the other end. Adjust push rod length as required to result in a vertical position of the idler arm, when the elevator is in a horizontal position. Cycle the elevator beyond the desired range of travel (about 30 degrees up and 20 degrees down), and verify that there is no interference nor impediment to this travel. Trim away any interfering material in the bulkhead center holes. Select the forward, shorter push pull tube components and set length such that the stick assembly will be in the neutral position when the elevator is trimmed to trail, and the idler is vertical.