

KIS4 Cruiser

BUILDERS MANUAL

S/N 4052

FUSELAGE SECTION 3

DOOR LATCH ASSEMBLY

The 4 place door latch , while very similar to the two place latch incorporates changes to improve reliability and rigidity. The primary difference between the two latch configurations is that rigid tubes replace the cable and spring system from the 2 place. This results in a much more rigid system when the door is latched, and a direct indication is provided to assure that the latching has taken place.

A section of aluminum rectangular tube is supplied for fabrication of this handle. The pivot points for the push tubes are in line with the basic pivoting axis, at roughly 1 and 1/4 inch each side of the pivot (The one inch offset shown in previous drawings is rather minimal and a 1 1/4 inch offset will provide more travel and more reliable overlap in the latch) . Drill and countersink one face on each side of that center pivot for a #10 flat head, and drill and tap the other face for a #10 X 32 UNF thread.

The operating "rods" are made from 3/8 OD aluminum tube with approx. .040 thk wall. The handle ends of the tubes are drilled through with a clearance dia (about .190 .) hole, and a minor amount of bending will be required for satisfactory operation of the latch.

The latching ends of the tube should be tapped for a 5/16 UNF thread, and the two latching "bolts", may indeed be bolts with a 5/16 UNF thread. Cut off the tops of these bolts and round the ends to a bullet like rounded point.

4pl fUSELAGE THIRD SECTION (of four)

FIN RIGHT HALF INSTALLATION

The fuselage upper section should be temporarily installed for fitting the fin halves to the fuselage lower section. Carefully locate the center line in the aft edge of the fuselage top section, and mark it for reference during the procedure below. The fin half joggles will go below the top section aft edge, and on top of the bulkhead in this area.

Select the right side fin half molded part from the kit, and dry fit the part to the appropriate position on the fuselage assembly, using the previously drilled holes and clecos or small sheet metal screws (slipping the edge below the aft edge of the fuselage top). Check to see that the fuselage top will set down in it's proper overlap with the fuselage bottom, and that the two fin halves will not overlap nor gap excessively in this area (gap between the fin halves should be about 1/16th inch) .

Note any areas which may require added trimming, or filling, and mark and trim as required (do not trim the trailing edge flange, where the rudder will be installed). The bulkhead may have to be trimmed or built up with dry MICRO to assure a smooth line through the fuselage top to fin joint. This bulkhead can be built up with dry MICRO by taping off the bonding inner surface of the fin half and pulling the fin half section up against the fuselage top inner surface with sheet metal screws or clecos.

Tape over the open area on one side of the gap and fill from the other side with dry MICRO. Allow to harden, and the seperate the surfaces and grind away any surplus, and roughen bonding areas.

Clean and prepare all areas which will be involved in the bonding operations (the joint to the fuselage, and the area which will be bonded to the rudder post). Particularly check the relationship with the rudder post such that neither part will displace the other, and check the fitup for bonding.

Also recheck the fit of the other fin half at this time, also using the predrilled holes for location and mounting. Remove the other fin half if required to get a good fit with the top of the STA 139.5 bulkhead and trim or adjust as with the other fin half, as required to assure proper installation later. After assuring that there will be a good fit in subsequent bonding, remove this part and set it aside

When you are satisfied with all fit up procedures and are ready to bond the right side fin half into place, prepare and "butter" on the adhesive (wet FLOX can be used for this bonding operation) on both surfaces, at all bond areas, including

the edge of the standing rudder post. Secure the parts in place with the screws and/or clecos and any other clamping or taping that might be required.

Remove the screws or clecos when the adhesive is in the "rubber" state (usually the next morning is still OK. If the bonding material has cured too hard, heating the screw heads with a soldering iron will facilitate the removal).

Cut out the the front rib/spar, and the large fin rib from the premarked panel, and fit them to the fin half profile in the location as shown in the figure below. Prepare the inner surface of the fin half, and the surfaces of the cut out parts, for bonding.

**IMPORTANT - IMPORTANT -
IMPORTANT**

The VHF comm antenna should probably be mounted inside the vertical fin at this time. This antenna is not included in the kit and can either be a commercial unit, or one of the numerous built-in units that are marketed for homebuilders.

Arrangements are being made to offer a kit for this as a low cost option, so it would be a good idea to contact Tri-R Technologies before this operation is scheduled. Part of the antenna will very likely be bonded to the right fin half under the axial rib, so it should be installed before this rib. However be sure to avoid interference between the antenna and the BID tape bonding the fin half to the rudder post. Bond the antenna sections in place, and recheck the fit up of any of the components that bond over the antenna.



Tack the rib/spar and rib in place with 5 minute epoxy. Recheck with other fin half, and trim these ribs if needed to avoid pushing the fin out of shape, and to provide for a good bonding fit. Bond the front rib/spar and the large rib to the inner surface of the right side fin with two inch wide two ply prewetted BID (a "prelam" as described elsewhere). The rib is installed parallel to a horizontal line and rests on top of the front rib/spar at the front end (see figure).

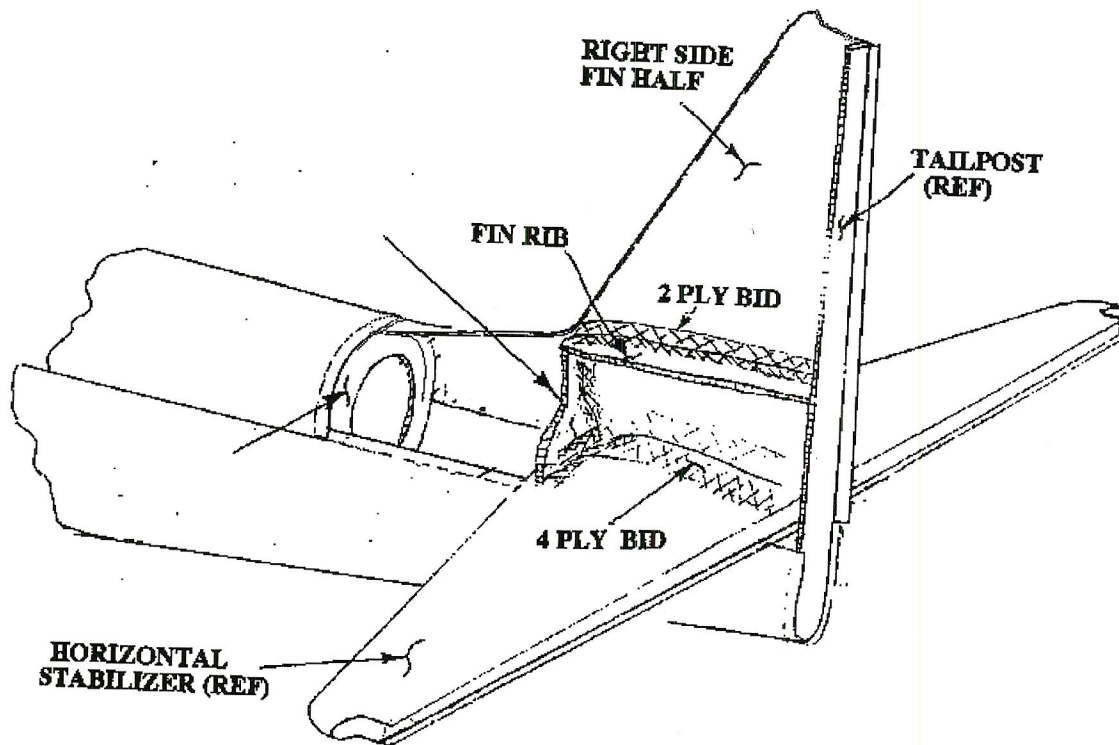


FIGURE - Fin with rib and spar installed

Bond the rib in place, also using two inch wide BID tape .. Temporarily mount the rudder to the edge of the fin molding (clecos or small screws through the hinges). During this temporary installation of the rudder assembly to the rudder post (spar) the location of the rudder bell crank shall be verified. This rudder bell crank appears lopsided at first glance, but the system pivot plane is along the right side edge of the rudder. Ensure that the height of this bell crank will not result in any interference between the rudder cables and the elevator horn (bell crank).

Be sure that adequate adhesive is applied (surplus will be squeezed out and removed later). Mount the part and install clecos or screws to close the joint adequately. If any areas buckle apart adjust the clecos or screws on each side, and add additional fastenings if required to close the entire joint line.. Clamp the fin half shell and the rudder post together to assure good fit up between those components, and install a 2 in. wide, 2 ply BID tape between the forward surface of the rudder post, and the inner surface of the fin half . Clean off any adhesive which squeezes out to minimize sanding at a later time. Join the inner surface of the vertical fin to the upper surface of the horizontal stabilizer with 4 ply BID with a roughly 3 inch overlap.

The fin vertical spar structure is primarily provided by the multi layer wet BID¹ bonded to the back surface of the tailpost, and up the inside surfaces of the fin sides. Three layers run the entire vertical length of the tail post. Make sure that the side plies in this "U" section are laid in smooth and flat to avoid unnecessary bulk in this area where the rudder hinges will be installed. Four more plies shall be added in the hinge areas (about 1 inch past the length marks previously noted) covering the total flange within this zone, and overlapping about a half inch on to the tailpost area. Green trim the surplus material extending past the fin skins. Remove the paper tape from the leading edge, and apply two ply BID tape to bond the leading edge of the fin together. Stay within the recessed "joggle" area to avoid excessive sanding in later finishing operations.

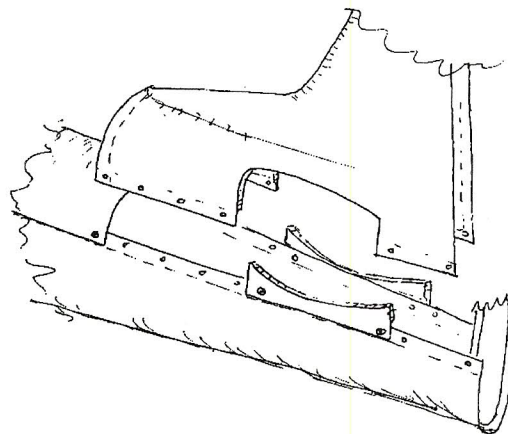
Check condition of adhesive as it cures, and remove the temporary fastenings while the adhesive is still rubbery. Make sure that the adhesive has the required strength to maintain the bond, but not so hard that the fasteners cannot be removed (heating the temporary fasteners can aid in their removal).

Mark the location and length of the rudder hinges on the outside of the fin half. These marks will be used later to located local reinforcement for the rudder hinges. Remove the temporarily installed rudder and proceed with the fin assembly process.

INSTALL LEFT FIN HALF

Dry fit the other (left side) fin half in the same manner as for the right half, with special attention to the fit-up with the ribs and tailpost. as before, and follow the same preparation and bonding procedure , except the ribs and internal structure will require special preparation for bonding at this time as well. Remove, or crush back the honeycomb core for about a 1/4 inch depth along all the panel edges which will be bonded. These

recessed areas will be filled with a thick FLOX mixture during the bonding operation. Temporarily position the fin half to transfer some of this FLOX to the mating areas . Remove the fin half, and using the transferred mixture as a guide, coat these areas with additional FLOX, as well as adding adhesive to the obvious bond zones. Reassemble and bond the fin half in place (wipe away any



excess adhesive that may be squeezed out of the joints). The top of the fin is left open at this time. Paper tape is suggested on the leading edge to help hold all components in position during this bonding.

Apply four plies of BID to join both fin halves to the upper surface of the horizontal stabilizer. The best procedure to follow is to lay an initial two ply strip 6 inches wide (3 inch overlap on each side), followed by a 5 inch wide and a 4 inch wide. This will provide a tapered surface patch for easier smoothing and painting. As in all previous inside angle joints, provide a MICRO fillet radius in the corners.

HANGING RUDDER

Install the rudder in the same location as for the temporary previous installation. The right side flange of the rudder post channel section shall be drilled for mounting the hinges. drill holes to match the hinges, and use countersunk head screws with the counter sink or Tinnerman washers, and elastic stop nuts on the inside. Verify the required travel, and trim any areas of interference. check actuation rod length for proper rudder position with the rudder pedals centered. Verify that this rod and the rudder may be cycled through full travel without stoppage or undue rubbing on any structure, and that the rudder travels in the proper direction with control activation.

INSTALLATION OF FUSELAGE TOP

The top fuselage section should be final installed after both fin halves have been bonded in place. Carefully dry fit the top molded section verifying the trim line of the top half which is to be installed aligned to WL-1.25 , which is the bottom of the joggle in the bottom fuselage molding (Remember that WL 0 should be the top trimmed edge of the fuselage bottom half, resulting in a 1.25 inch overlap on the bond line). Prepare the bonding surfaces (of both parts) by roughening with coarse sand paper, and cleaning away all traces of parting compounds or oily residues with lacquer thinner or acetone (observe all safety precautions in using these volatile solvents). Drill alignment holes for cleco's or other temporary fastenings such that the bond line will be continuously clamped without buckles or gaps. CAUTION - DO NOT DRILL THROUGH THE GRAPHITE (BLACK) STRIP ALONG THE BELTLINE OF THE LOWER FUSELAGE HALF SINCE THIS IS A MAJOR STRUCTURAL ELEMENT. Mark the ends of the bond area length on the lower fuselage molded half, for reference in applying the adhesive.

Separate the halves and mix the Hysol adhesive, or epoxy FLOX, according to the appropriate material instructions, "Butter the adhesive on the outside of the lower fuselage, and also on the inside of the upper fuselage section, in the bond areas (directly above the joggle line for the previously marked length. Replace the top molded shell, using care to keep from scraping away the adhesive in any areas. It is recommended that a helper be enlisted for this operation since it is realistically at least a two person job. If the adhesive is scraped away from any of the bond areas pry that section of the joint apart and work adhesive into the area. Replace the cleco' or screws to clamp the joint together. Observe that adhesive is squeezed out in all areas and wipe away the excess before it cures. Remove the cleco's or temporary screws when the adhesive has cured to a rubbery stage, and before the temporary fastenings are bonded hopelessly hard (heating the screws or clecos with a soldering gun can be an aid in removing them if the adhesive has hardened too much). Use spreader bars to maintain fuselage contour, and double check all work.

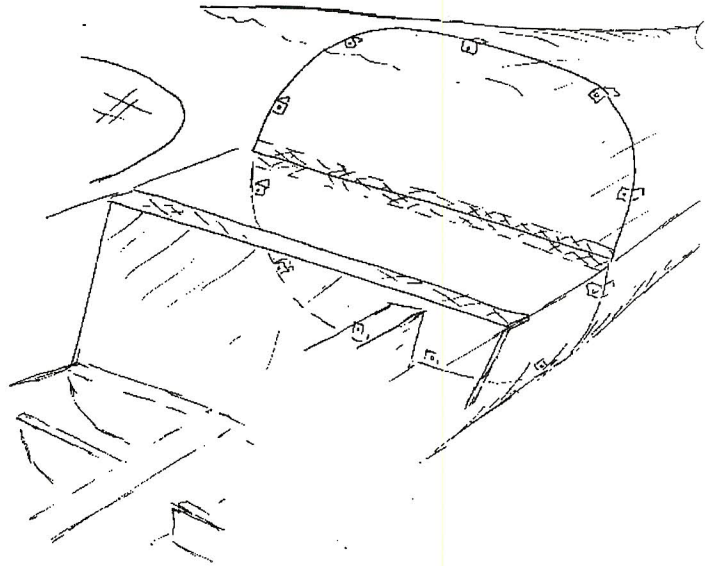
The horizontal stiffener on the rear seat back (which was set aside early in the seat installation) may now be installed and bonded to the seat back, and the lower fuselage shell with 2 inch wide 2 ply prewetted BID. Fill the joint between the ends of this stiffener and the upper fuselage shell with a dry MICRO fillet, and bond the seat back stiffener to the upper shell with 4 ply BID. provide at least a 2 inch wide overlap on the seat back stiffener, and 4 inch overlap to the fuselage upper half.

The upper sector of the STA 139.5 bulkhead should now be bonded to the fuselage upper half with 2 inch wide 2 ply BID bias tape, both front and back (this bulkhead was similarly bonded to the lower fuselage half at an earlier stage, and this completes the tie in). As in other similar bond operations a dry micro fillet is worked into the joint before taping.

The upper half of the firewall should also be bonded to the fuselage upper half at this time. Use 2 inch wide, 2 ply prewetted BID on the forward surface , and a 3 inch wide 2 ply BID for the inner joint to assure over one inch overlap on both surfaces. As before, use a dry micro fillet on the inside corners to assure joint integrity.

BAGGAGE AREA BACK PANEL

The baggage area back panel is totally non structural, and shall be removable for maintenance access to the rear of the fuselage . It is to be fabricated from locally obtained materials and must be light weight, but sturdy enough to prevent item stowed in this area from migrating back in the fuselage.



PRPARE INNER DOOR SKINS

Select the appropriate inner door skin and prepare for assembly. Strip off all peel ply and other remnants of the molding process. Carefully sand the perimeter of the molded part to remve any dangerously sharp edges.

Trim the outer door perimeter per the lines molded into the surface of the part. These lines were scribed into the mold surface and may be difficult to see. Feel with a thumb nail and mark by a light rubbing with a pencil. Verify with the door opening to assure that you are not removing too much material..

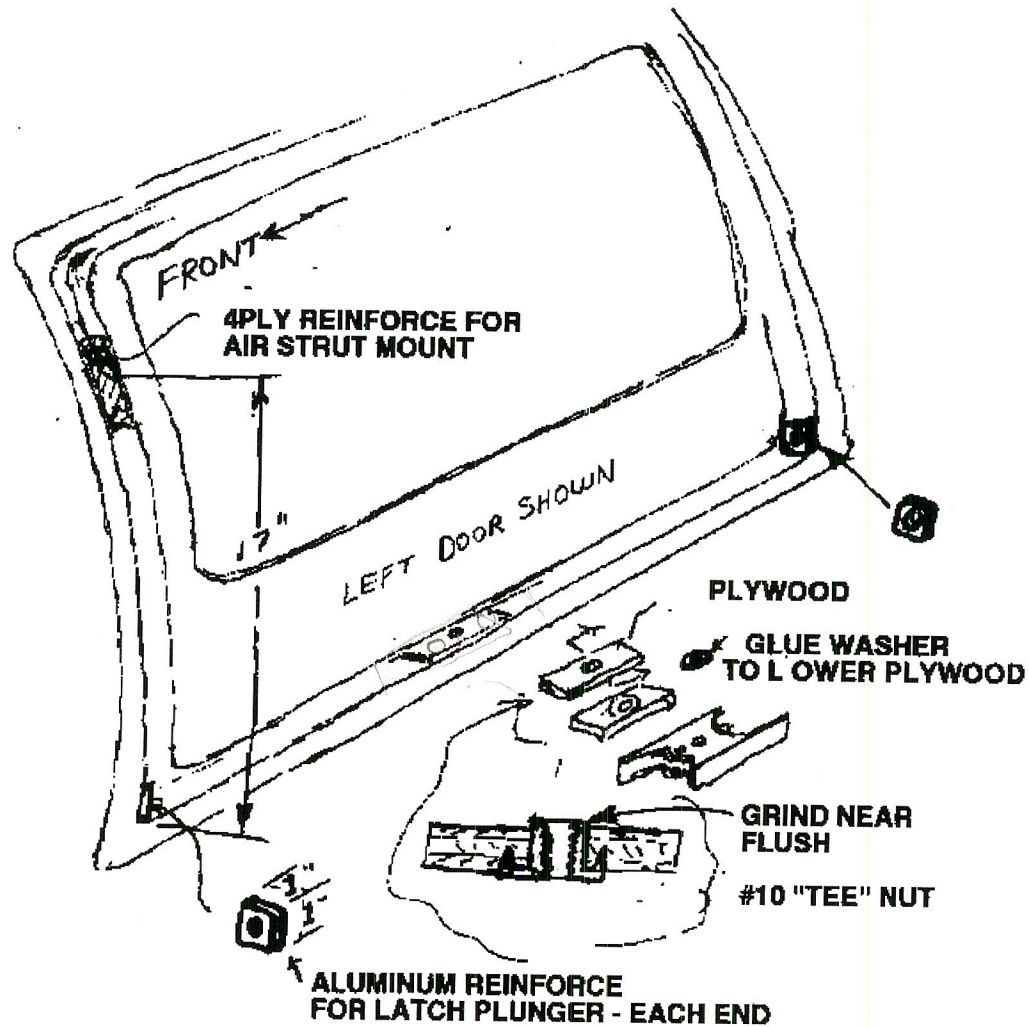
Similarly trim out the window opening

Bond in inserts of 1/8 in thick aluminum on the inner surface at the front and back of the door frame bottom channel where the latch plungers will protrude from the door. (see figure)

Locate the proper position for the latch operating handle. Scribe lines in the mold will show the basic location for the handle inside cut out. Use this location for the following steps.

Prepare two pieces of 1.5 by 4 inch 1/4 in plywood . Drill a 3/16 hole through the center of the bottom one and glue a washer on the top surface centered on tthis hole. drill a 1/4 inch hole and install a #10 "TEE" nut in the center of the other plywood section.. Cut out the appropriate handle for this door (see drawing), and fit to the hole in the inner surface, locate and drill the 3/16 hole in the bottom leg of the inner door skinn channel such that using this pivot point will place the outer surface of this handle flush with the outer skin . using a #10-32 bolt and the latch handle as fixturing, bond in the two sections of 1/4 inch

plywood on the inner side of each channel leg with a FLOX/MICRO mix. Make sure that the handle will be free to operate.



At this time the local reinforcing for the door support air strut mountings should also be added to the door inner panels. Lay four ply BID in the bottom of the front window frame stiffening hat section centered about 17 inches up from the bottom of the door frame and about 6 inches long. This BID should be wide enough wrap up the sides about 1/4 inch. This will provide local stiffening in this area, and provide enough "meat" for the self tapping screws which will be used to mount the air strut bracket.

trim the door opening in the fuselage upper half. Cut along a line roughly 1/2 inch inside the inset angle which defines the opening area. Test fit the door inner shell into this opening to assure fit, and trim away any interference.

- Window First?
- ① Set in Big Board & Latch Fixture using clecos
 - ② Fiberglass & Flex Fixture (Taped) ^{release}
 - ③ Screws to Fixture ~~remove board~~
 - ④ set window
 - ⑤ remove ~~Fixture~~ board & Latch
 - ⑥ attach skin Template to Fixture
 - ⑦ attach skin
 - ⑧ rout out template
 - ⑨ remove fixture
attach latch & rivet



Tack the door inner panel in place in the door opening in the fuselage using 5 minute epoxy or bondo, and shimmed up to match the outer fuselage contour, small blocks of 1/4 inch plywood can be used to simulate the thickness of the door perimeter seal (it is probably better to do one side at a time to permit more accessibility for working on both the inside and outside). Adjust the position to center the window in the open area of the door opening, using the hinge areas as a guide.).

WINDOW INSTALLATION

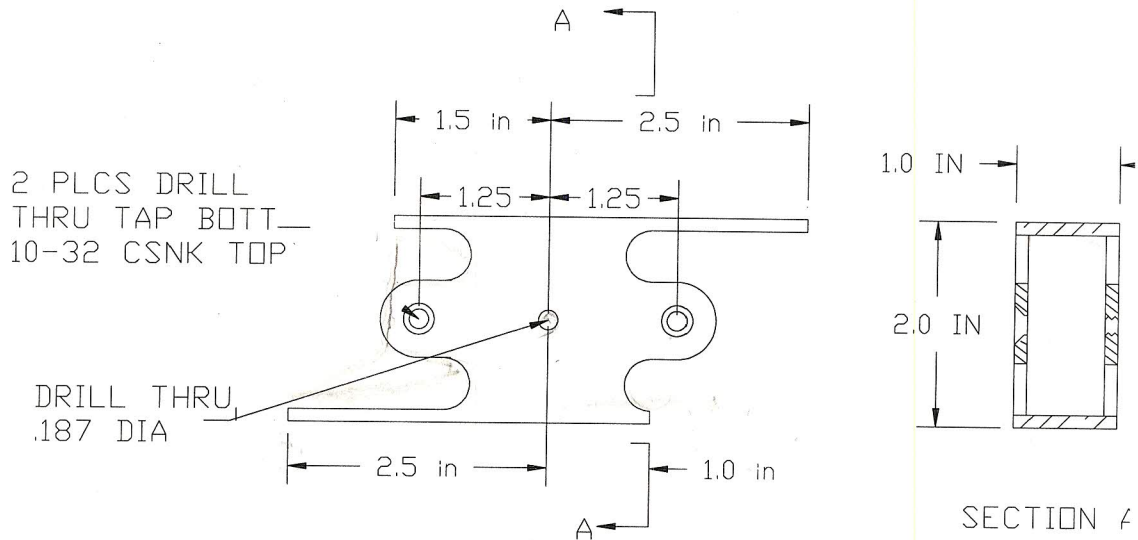
Select the proper formed window panel, the A panel is for the left side. Position the window panel over the window opening, and roughly mark the outline of the frame on the protective covering. The formed window panel is supplied oversize, and some trimming of the Plexiglas part may be advisable at this time, you must leave a minimum of 1/2 inch bond area around the perimeter. It is best to trim the window with a sharp fine tooth bandsaw blade. Be very careful in these operations, plexiglass is easily marred, chipped, or cracked, and windows are very expensive. Peel back this protective covering to about a quarter inch inside the window opening line, and cover the exposed plastic with masking tape. Position the window in the opening again, and again mark the opening (more precisely this time). Trim the masking tape to this line and expose the area which will be bonded to the window frame. It is advisable to apply a second layer of masking tape to this line to assist in cleaning up the edges after bonding by removing this layer of the tape while material is still wet. Roughen the exposed surface of the plastic with coarse sandpaper to prepare for bonding.

Mark the window opening on the protective paper on the outer window surface. Peel back the protective window paper covering, and double tape this area as was done with the inner skin surface. Also trim the masking tape to expose the bonding area, and roughen with coarse sandpaper as before. Also clean and roughen the other bond areas on the inner surface of the outer skin, and the outer skin.

Clean and roughen the area where the clear plastic window panel will be bonded. Test fit the prepared window panel in the opening, and adjust the exposed surface as required. Mix the Hysol adhesive, or epoxy FLOX, and coat both the window plastic and the window frame with the adhesive. Carefully position the window in the opening and tape into place until the adhesive cures. Squeeze out any surplus adhesive, and clean up the surplus and smooth a fillet around the edge of the joint. before the adhesive cures.. Removing the second layer of masking tape will help facilitate the clean up around the bond area.

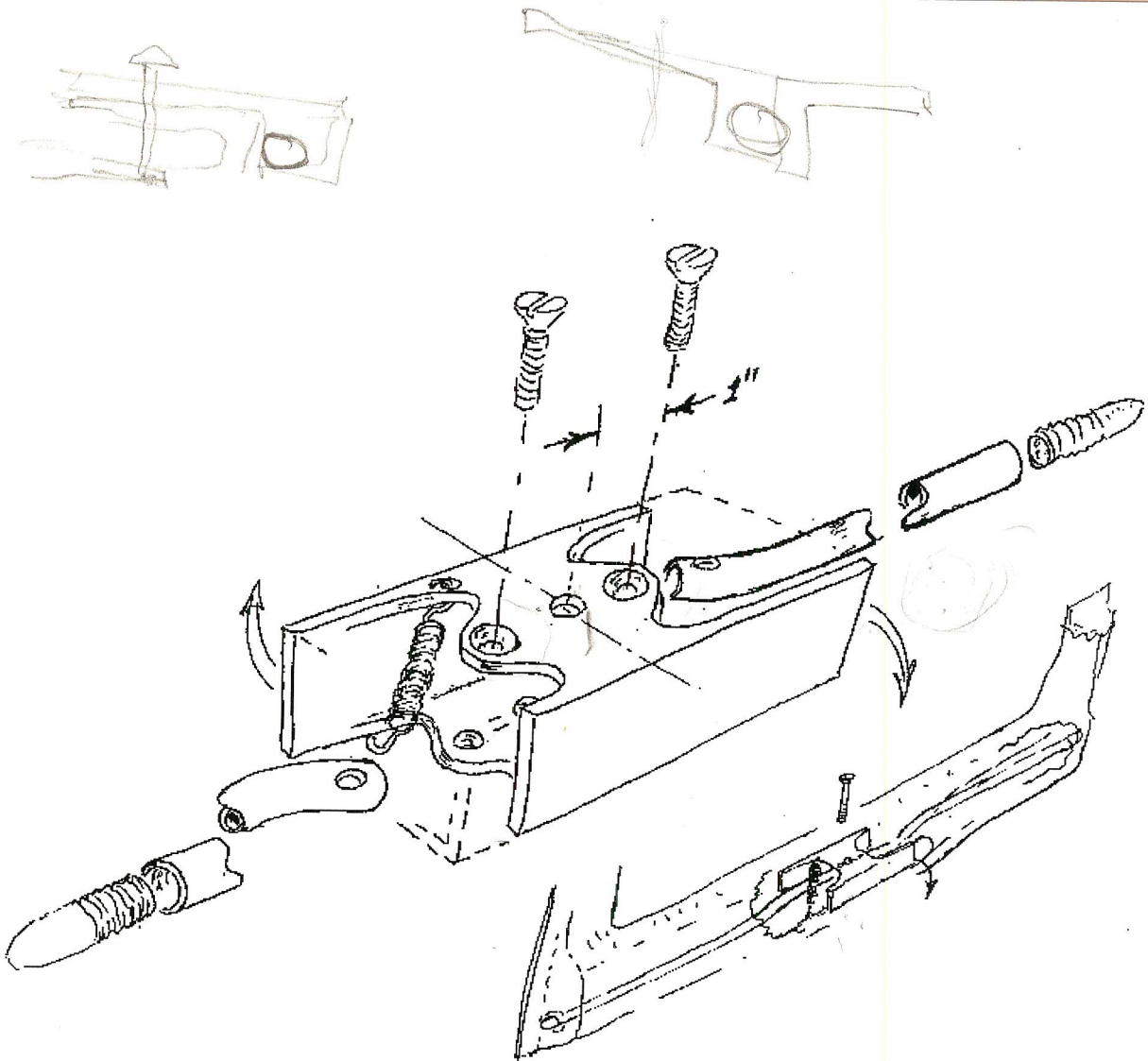


MAKE FROM 1 BY 2 IN .125 WALL
SQUARE TUBE FURNISHED - CUT
IN HALF WITH 45 DEG. CUT



FILE 4PLATCH - 4 PLC LATCH HANDLE
TOP VIEW RIGHT SIDE LATCH SHOWN
LEFT SIDE LATCH OTHERHAND

It would probably be advisable to "mock up" the system on a board with your dimensions marked as a perimeter. This will let you trim the tubing to the proper length, and bend it as required to go through the cycle without jamming. Adjust the length such that the reworked bolt slides through the the metal guide insert in the door panel, and the travel will not try to drag the joint over the metal insert .



A relatively light tension spring should be used, located to provide a closing torque on the handle. The end of the spring can be tied to the wall of the latch enclosure, and a dab of dry micro will seal off the wire ends to avoid scratching yourself in the future. A heavy spring is not needed, since the system goes "over center" in the full latched position, and a theoretically infinite force on the end of the latch bolt will not overcome the spring to unlatch the system. With the rigidity of the tubes, a mere visual glance at the handle will assure you that the latching bolts have been pushed into place (if the door is any where near closed).

This latch system requires that one be aware of holding the handle in the full open position while closing the door, to avoid damaging the paint around the door opening. Neither the 2 place system, nor the 4 place system, as designed, can be slammed shut. without damage to the paint and the door perimeter.

With very careful adjustment of the plunger lengths, and a tapered metal striker plate. a slam to latch system could be contrived. However, the increased plunger insertion depth with this current system provides more peace of mind.

Test position the assembly, and mark the location for the latch pin hole where the latch plunger will have to protrude out through the door inner skin molding. Drill a clearance hole for this pin (about 5/16 inch diameter) through The inner door skin and the reinforcing 1/4 inch aluminum section previously bonded in. Hold the assembly in position with the pin protruding through this hole and test assemble the complete latch system and verify function.

Test fit the outer skin again, and trim any areas for correct assembly (particularly check around the handle). Clean and sand all bonding surfaces. Apply adhesive to both surfaces (particularly in the hinge area, use care in the areas around moving parts such as the door handle). Tape the outer skin in place until the adhesive cures. Local areas requiring an assured bond (such as the hinge areas) may be clamped together with a Cleco, or a small screw as a temporary clamping procedure. Clamping these two surfaces tightly together may distort the the door moldings in the hinge area. In this case fill the void between the two skins with a FLOX mixture, and allow to cure with the proper spacing. Remove these temporary fasteners in the same manner as for the other fuselage bond lines. When the bonded joint has cured, make alignment marks for future positioning, and remove doors, and trim to fit opening.

MOUNT DOORS

Reinforce the door hinge pads in the fuselage top molding by overlaying 4 ply BID on the inner surface. Use a tapered overlap at the edges extending from about 1/2 inch to an inch beyond the pads. Select the door hinges from the supplied hardware, fitting the short length of the hinge to the fuselage in the pad area on the fuselage molding. Mount the hinges by the short sides, to the fuselage molding, and the long side to the door. Temporary bolts can be used at this time. The molded recess in the fuselage top should hold the hinges in line, but check to make sure the hinge pins are aligned in both planes such that the door will not bind in operation.

With the trimmed door assembly positioned in place (use short sections of 1/4 inch plywood or other material to provide the clearance around the perimeter of the door for weather stripping.), swing the door end of the two hinges up to the recess in the door molding. Use a dry MICRO/FLOX mix as a liquid shim to provide alignment of the hinge surface to the surface of the door assembly. Lightly bolt the hinges to the door recess, being careful not to distort any components, nor extrude excessive MICRO/FLOX out of the joint. The pivot points of the two hinges must be in line (co-axial) or there will be binding when the door is opened. When the MICRO/FLOX cures, unbolt the hinges and peel them off the MICRO/FLOX. Clean up the mounting surfaces and re-mount with the final counter sunk bolts (#8-32 screws). Set the heads flush with the

outer surface of the skin on the doors. The use of removable bolts on the door side of the hinge sets will allow a little adjustment leeway when the holes are slightly enlarged, such that the doors can be adjusted for best fit. Adding hard paper or metal shims, or sanding away the cured FLOX will also allow needed adjustment range. The hinge recesses on the fuselage top may be filled in with dry MICRO and smoothed for appearance and aerodynamics, once the door is satisfactorily positioned and proper operation verified (door removal can be accomplished at the door side of the hinge for any future maintenance).

LATCH PLATE INSTALLATION

The latch plate for the door securing system for this aircraft is probably best accomplished by bonding in a short section of tubing at the fore and aft door frames. Use about 1 inch long section of , or a drilled piece of steel to make a hard surface for locking the latch pin. Tape off the door surface so the insert bonding will not bond to the door, and wax the latch pin end so it will not be bonded in place. Close one of the two doors, and position the door with tape or screws, and shims in the location desired. Slip one of the hard insert parts on each of the latching pins (making up a rubber washer to space out the insert from the door will aid in positioning this system). Adjust the location of these hard inserts such that the open end is spaced properly from the edge of the door frame so the pin will clear in the latch open position, and with a combination of wet BID and flox, bond them to the door frame. "Tack bonding is probably a good idea at first, and open and close the door gently to assure proper positioning of the inserts. When assured of the proper location fill in, and complete the bonding and enclosing of the inserts with added glass and FLOX. When completed on one side do the other latch system in the same fashion. (see figure)

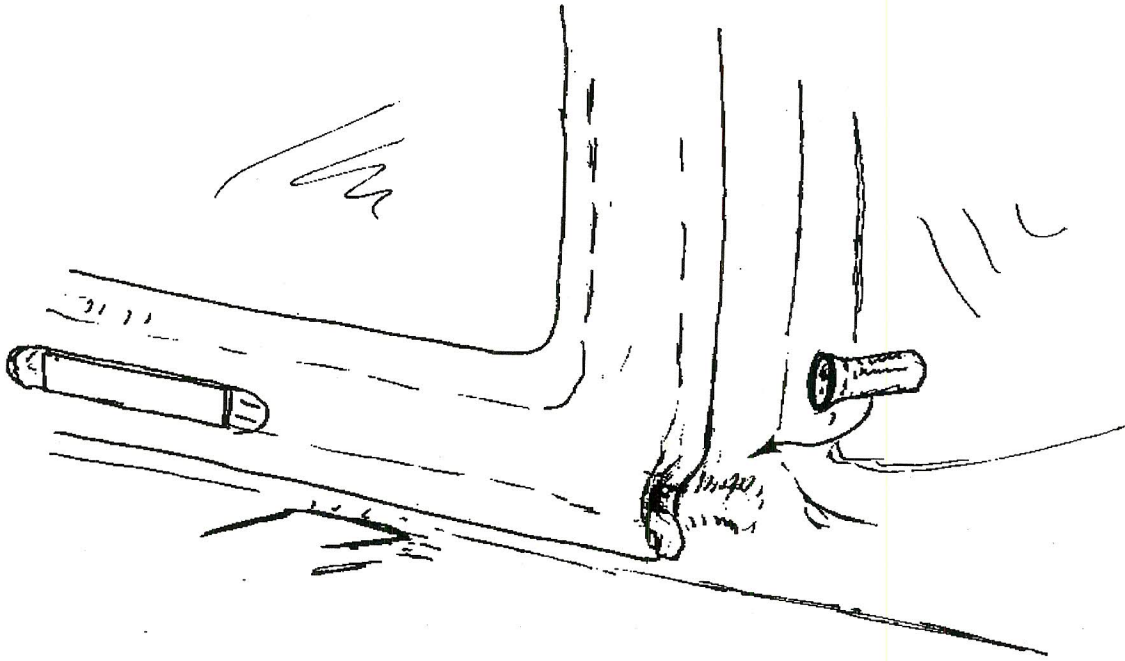
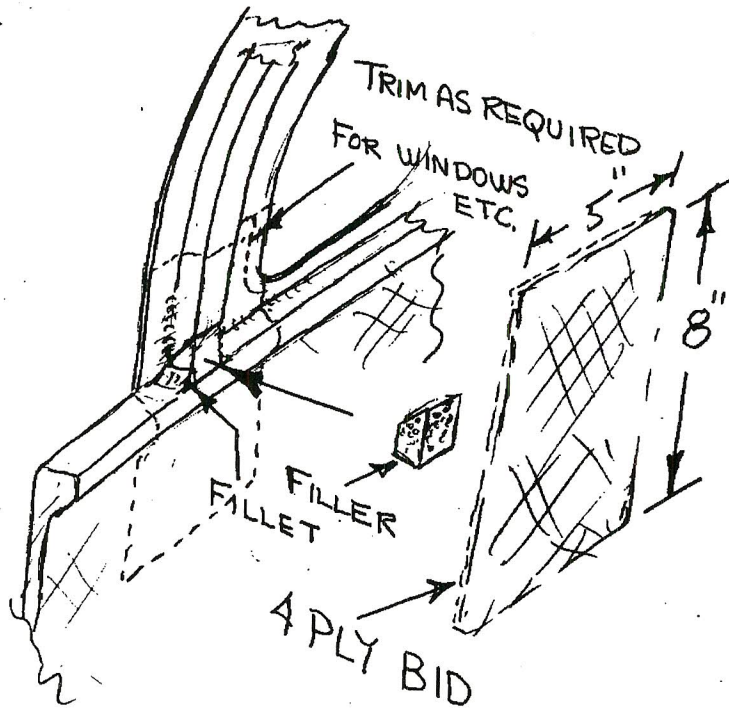


FIGURE - DOOR LATCH PLATE INSTALLATION

DOOR OPENING REINFORCEMENTS.

To add stiffness and strength around the lower corner of the door openings, an added reinforcing lamination of glass plies is recommended. While this is not a flight safety item, these added plies will reduce cabin shake during engine start and idle. This will also add significant stiffening in case you have a similar hapless incident like the pre Christmas excursion of the prototype Cruiser, which ended up on its roof after an engine failure and forced landing in a muddy field.

To maximize the effectiveness of this lay-up, bridge the gap between the end of the top stiffener "hat" section, and the lower fuselage longitudinal "rail" with scrap foam and dry MICRO. Use a generous (thumb size) fillet on any inside angle intersections. Make up a four ply BID prelam about 5 inches wide and about 8 inches tall, and apply to each of these 4 locations (see sketch)



AIR STRUT INSTALLATION

Locate the air struts (for holding the doors open) and brackets supplied in the kit, and mount as shown in sketch . Mock up the assembly carefully to assure that the stroke range of the air strut will not be used up without proper open positioning of the door, and that proper clearance is provided between all components during operation.. It is suggested that you mark the bolt locations for the upper bracket in the fuselage door frame flange, and add about a 2 inch wide by 6 inch long 2 ply BID reinforcement to the inner surface to stiffen this mounting area. Drill and countersink for mounting with 2 #8-32 flathead screws and lock nuts. The hat section of the door panel was reinforced earlier, and these brackets can be mounted directly with the self tapping screws supplied. A little bit of FLOX "shimming" under these brackets may provide a more secure mounting.

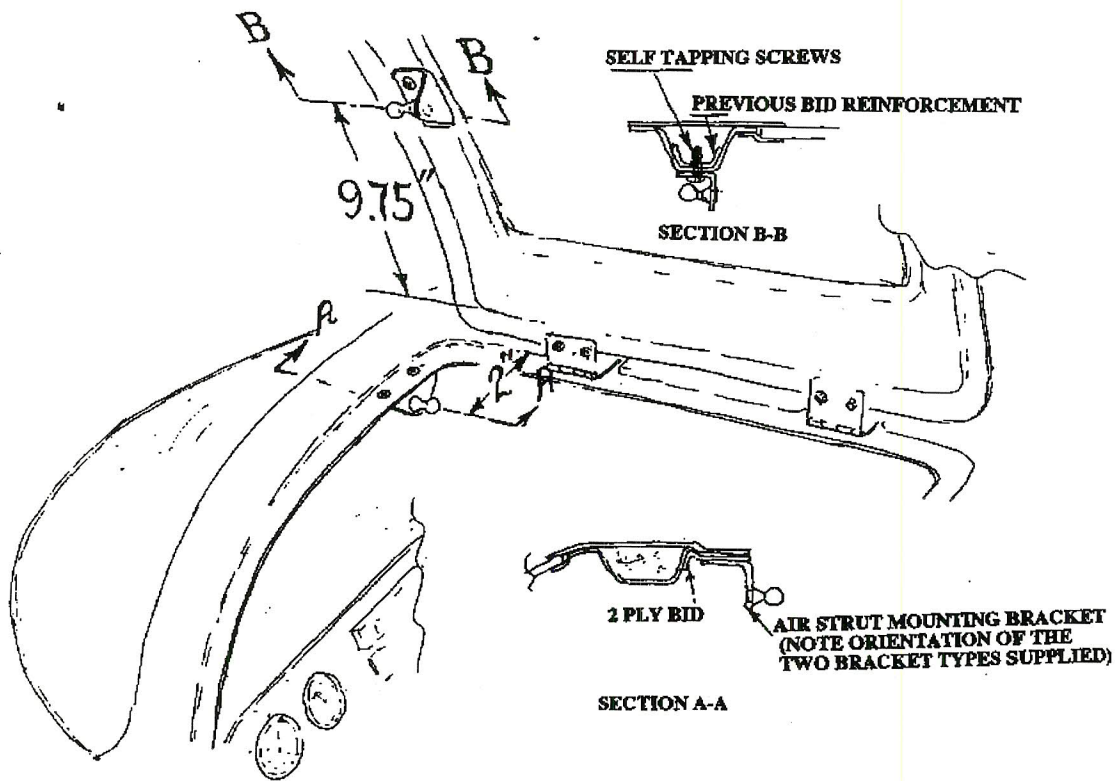


FIGURE - Air strut installation on doors.

REAR WINDOWS

The rear windows are inserted in much the same fashion as for the windows in the doors. The molded window panels are oversize, so some degree of trimming will be required. trim the fuselage opening to final size, and hold the window molding up against the inside, and mark the opening. Allow a minimum of 1/2 inch for bond overlap in the trimming operation. As before, peel back the protective cover, and mask with tape to the opening edge (two layers as before). Roughen the bond area with coarse sandpaper (on both the window and the fuselage) and apply the adhesive. A suggested method of clamping using wood blocks and "drywall" screws is shown in the figure below.

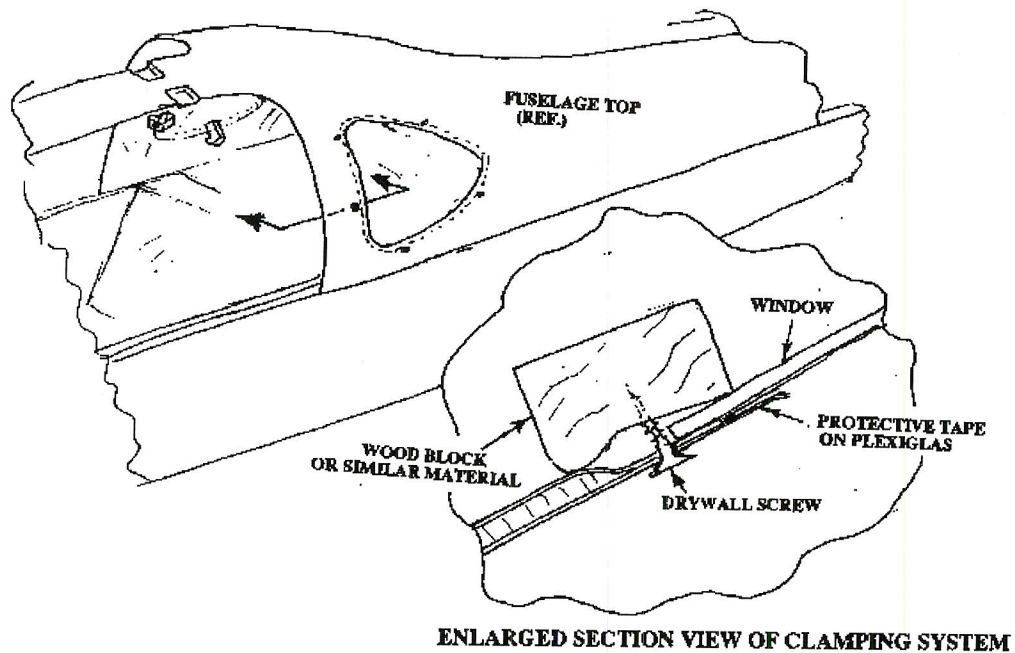
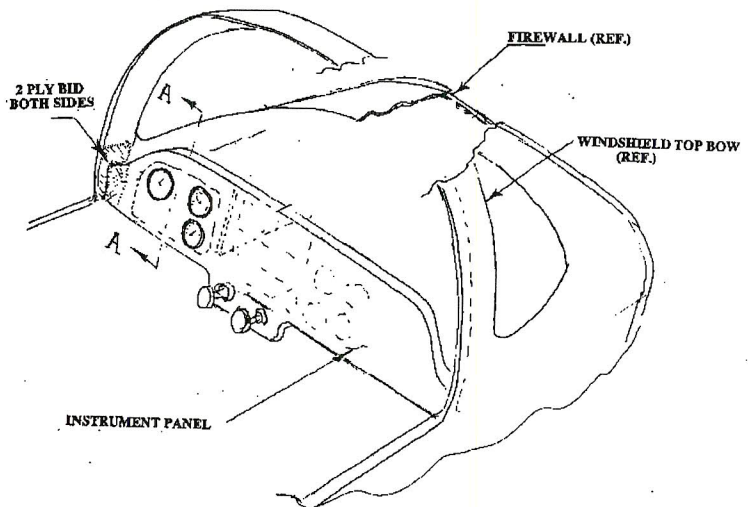


FIGURE - Clamping scheme for inserting rear windows

Drill the holes very close to the window edges (about 8 or so places are suggested, and add extra clamps in any area where a gap occurs), and tighten the wood blocks to squeeze out surplus adhesive. Wipe and clean any surplus /adhesive as soon as possible to avoid later problems. When the window adhesive cures, remove the clamps, and prepare the inner edge of the window for bonding. Use the same procedures of peeling back the protective covering, and masking. Bond the inner side of the window with a single ply prewetted BID tape. Be sure that this tape covers the holes that were drilled for the clamping, and fill from the outer surface with relatively dry MICRO. (It is recommended that the windshield be left out for a while longer)

INSTRUMENT PANEL

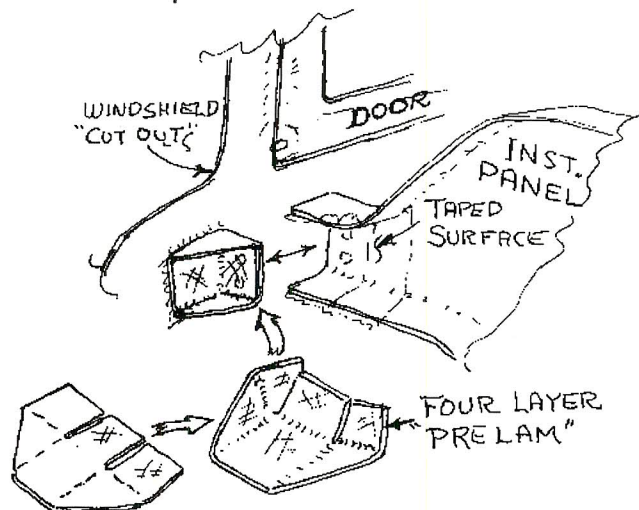
The instrument panel for the four place aircraft is a premolded panel (which is also optional for the two place kit). It is probably a good idea to make the instrument cut outs before installation wherever possible so a drill press or other tooling can be more readily utilized. This can be accomplished in at least two ways. One is by cutting the areas oversize, and fastening in insert panels of aluminum as was done on the original tri-gear



prototype. The other approach is to directly mount the instruments in cut outs of the composite panel. Review the suggested instrument panel layout shown in another section of this manual, so that a standardized layout shall be used to assure safe operation of the aircraft.

.Position of the panel is somewhat of a personal preference, making sure that adequate clearance is provided for the knees, and sufficient room is provided behind the panel for installation and servicing of the instruments. Bond the panel into position with 2 layer prewetted BID tape.

Another approach which has been used with some success on the prototypes is to have a bolt in panel. This is accomplished by covering the normal bonding areas on the inner surface of the outer ears with clear tape, and laminating in what will become a form fitting mounting flange. A prelam of roughly four plies of BID is suggested using a patern similar to that used for the engine mount pads (see sketch). After the parts are seperated and cleaned up use a minimum of 2 #10-32 bolts on each end to secure the panel..



The upper area is left open at this time, and delaying windshield installation will permit better access for installing instrumentation and wiring. The center of the panel will be excessively flexible, so some form of stiffening should be provided bracing the the panel to the firewall. The exact form of this stiffening will be dictated by the radio and other equipment installed. Aluminum angles for the radio "tray" is a good approach.

After the instruments and wiring have been installed, it is suggested that a light, flexible, cardboard or fiberglass panel be covered with non reflective upholstery material, and retained with velcro for the "dash " cover and instrument dust cover (or inquire about the optional cover from the factory). This panel should be sturdy enough to set an occasional small book or manual, yet light weight and easily removed for maintenance.

WINDSHIELD

The windshield should be one of the last things installed on the fuselage, since it will restrict many operations in the cockpit area. Make sure that you have planned out the rest of your final assembly before bonding the plastic into place.

The windshield shall be installed using the same techniques utilized for installing the back windows. The only change recommended is the use of two ply BID for retention in this case to assure against the added loads and greater size of this panel.