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**CONSUMABLE SUPPLY LIST**

QTY.	DESCRIPTION
1	BOTTLE OF DENATURED RUBBING ALCOHOL
1	SOLDER ACID BRUSH
2	ROLLS OF 2" MASKING TAPE
2	ROLLS OF ¾" MASKING TAPE
6	WOOD BLOCKS
1	EXACTO KNIFE
5	SINGLE EDGED RAZOR BLADES
1	LITHIUM GREASE (STA-LUBE #SL3151)
1	TUBE OF CLEAR SILICONE SEALANT
1	LOCTITE #271
2	SCOTCHBRITE PAD (MEDIUM GRIT)
1	FINE POINT BLACK MARKER
10	PACKETS OF 3M AUTOMOTIVE ADHESION PROMOTER #06396
1	ROLL OF FRICTION TAPE (HOME DEPOT Model # 3407NA-BA-6)

## TOOL LIST

QTY.	TOOL
2	SAW HORSES (PLANS FOR THESE ARE PROVIDED IN THE WING MANUAL)
1	DIE GRINDER WITH CUTOFF WHEEL AND SANDING DISKS
1	12" RULER
1	16' TAPE MEASURE
1	AUTOMATIC CENTER PUNCH
2	36" LEVEL
1	DRILL MOTOR (CORDLESS IS HANDY BUT ELECTRIC OR AIR IS FINE)
1	ANGLE DRILL
1	#40 DRILL STOP
1	#30 DRILL STOP
1	#10 DRILL STOP
1	NUMBERED DRILL SET
1	CLECO PLIERS
30	NO. 30 CLECOS (COPPER COLOR)
30	NO. 40 CLECOS (SILVER COLOR)
10	NO. 20 CLECOS (BLACK COLOR)
10	NO. 10 CLECOS (YELLOW COLOR)
1	POP RIVET GUN FOR 1/8 INCH RIVETS (MARSON HP-2 RECOMMENDED)
1	RIVET GUN WITH NO. 30 RIVET SET AND BUCKING BAR
1	AIR COMPRESSOR AND BLOW NOZZLE
1	NO. 40 RIVET DIMPLING SET
1	RIVET SQUEEZER
1	DIGITAL LEVEL (SPI-TRONICS PRO3600 PN SPI 31-040-9 OR EQUIVALENT)
1	3/4 INCH UNIBIT (#1)
1	DIGITAL FISH SCALE (0 TO 15 POUNDS RANGE)
60	3" SPRING CLAMPS
6	VICEGRIP 6-SP CLAMPS
1	STRAIGHT TIN SNIPS (THESE TYPICALLY HAVE YELLOW HAND GRIPS)
1	TORQUE WRENCH (20 IN-LB TO 200 IN-LB)
1	12 INCH ADJUSTABLE SQUARE
1	1/4 SOCKET SET WITH, AT LEAST, 3/8 TO 9/16 INCH SOCKETS
1	DEBURRING TOOL
1	PAIR OF SCISSORS
1	#2 LEAD PENCIL
1	FINE FLAT FILE
1	TUBING CUTTER FOR PLASTIC TUBING
1	SHEET METAL NIBBLER

## INTRODUCTION

OK, this manual assumes that you have assembled the wings for your Carbon Cub and are now moving on to deal with the fuselage. This means you have some experience with this manual and the style of presentation. That is a good thing as there is less “getting started” explanation in this section. However, if you have chosen to start with the fuselage, you should not worry, as the instructions here are complete and should be easy to understand. If you really don’t understand (after carefully reading and thinking), please contact CubCrafters for assistance.

Options and choices – there are (almost) always options and choices. Building the fuselage is no exception. This little bit of “philosophy” intends to remind you that there are choices about the equipment to be installed. Obviously, if you want to have an ELT system, you will need to install the antenna. This particular option is dealt with directly in the text. However, other options are not. They are dealt with in appendices to the main document that are supplied when you purchase the components for an option. This document identifies the timing for installation of options within the sequence of the build.

First, a little Carbon Cub eye-candy:



**Photo 001**

## INSPECTION CHECK POINTS

It is always necessary to inspect after completion of the work. The periodic checks are set up to allow for the proper inspection points. Please examine the forms to acquaint yourself with the inspection points. Then proceed point-by-point checking your fuselage. It's a good idea to have one of your aviation-knowledgeable friends over-check your work. Your friend will only see "what is" where you might see "what was intended". Safety should be one of your highest priorities. All points on the inspection need to be satisfied. You don't want anything to be passed that should have corrective action. Page 3 contains a spot for noting discrepancies (if there are any). Use the form so that you don't forget to fix something (human nature being what it is and interruptions being common).

A few notes about the inspection points:

Because of the variation in options that are selected you may have more or fewer harness inspections to inspect. At minimum you will have the Electric Trim harness to inspect.

## BOLT LENGTH AND WASHER STACKUP

IT IS VERY IMPORTANT TO HAVE THE AT LEAST ONE THREAD PROTRUDING PAST THE NUT WHEN THE NUT IS PROPERLY TORQUED. THAT BEING SAID YOU WILL NOT WANT TO HAVE MORE THAN THREE THREADS SHOWING BEYOND THE NUT. THE WAY TO ACHIEVE THIS IS TO CHANGE THE WASHER TYPE AND AMOUNT. FOR INSTANCE, IF THE FIGURE CALLS OUT A AN960-416L UNDER THE BOLT HEAD. THIS WASHER COULD BE CHANGED TO A AN960-416 AND AN EXTRA AN960-416 OR AN960-416L MAY BE ADDED. AT NO TIME SHOULD MORE THAN TWO WASHERS INSTALLED. IF THE FIGURE DOES NOT CALL OUT FOR A WASHER, THEN NO WASHERS CAN BE ADDED, BUT IF THE FIGURE CALLS OUT FOR A WASHER ON THE BOLT SIDE AND THE NUT SIDE THE WASHER SUBSTITUTION MAY BE USED ON BOTH SIDES. IN SOME CASES A SHORTER BOLT MAY BE USED, BUT MAY NOT BE SUPPLIED IN THE KIT. KEEP IN MIND THAT IT MAY BE CRITICAL TO HAVE THE SHANK OF THE BOLT IN THE PART, NOT THE THREADS.

## FIGURES VERSES PICTURES

IN THESE MANUALS THE FIGURES WILL ALWAYS TAKE PRIORITY OVER THE PICTURES, BOLT DIRECTION, WASHER PLACEMENT, AND SO ON. PAY CLOSE ATTENTION TO THE FIGURES AND USE THE PICTURES AS A REFERENCE.

## FIGURE EXPLANATION

IN THESE MANUALS THE FIGURES WILL MOST OFTEN SHOW MORE PARTS THAN YOU ARE BEING ASK TO INSTALL. ONLY INSTALL THE PARTS THAT ARE NEEDED FOR THE SECTION THAT YOU ARE WORKING ON. YOU WILL MOST LIKELY SEE THAT FIGURE AGAIN IN A LATER SECTION AND INSTALL THE REST OF THE PARTS.

## FINAL BIT OF INFORMATION

IF YOU NOTICE THERE AREAS IN RED TYPE AND ARE ALL CAPITOL LETTERS. THESE ARE PLACES THAT COULD TRIP YOU UP. PAY SPECIAL ATTENTION TO THESE AREAS.

## SECTION 1 INSPECT THE FUSELAGE

The fuselage build will begin with inspection of the fuselage paint (powder coating) and fuselage condition. The fuselage was either shipped to you or you transported it from the CubCrafters facility. Either way, the fuselage has had a journey and was possibly damaged. Put on your best Crime Scene Investigator face and inspect every inch of the fuselage. Believe it or not, those flashlights the CSI guys use are actually good for focusing attention and for illuminating small things. You may choose to use your flashlight during the inspection. You're looking for any dents, deformations, cracking or serious scratches. Any of these discoveries will need remediation. Small scratches can simply be touched-up with a quality enamel or urethane paint of a matching color.

Please telephone CubCrafters to discuss remediation of any significant damage that you find. Photographs sent by e-mail will be useful for determining the proper course of action.

## SECTION 2 REMOVE SELECTED POWDER COAT FOR GROUNDING

Remove the powder coat from the rear of the top left engine mount.



*Photo 002*

### SECTION 3 FUSELAGE BOOT COWL SPACER

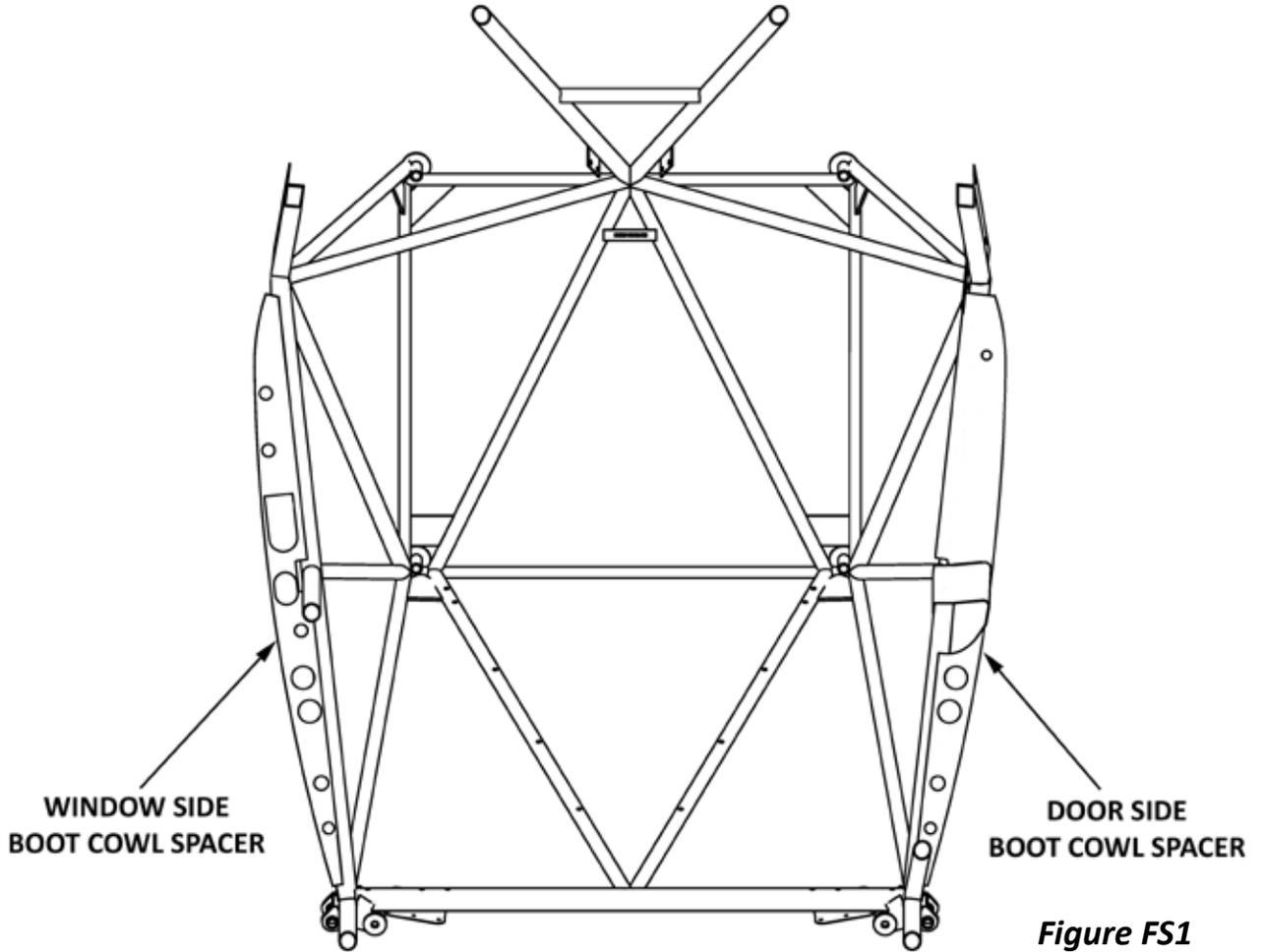
Examine the fuselage boot cowl spacers for damage. You should be able to visually inspect the edge of the spacer and tell if it lines up with the tube that it is welded to, and it should be lined up close to the center of the tube shown in Photo 003 and Photo 004. Should the spacer not line up, gently form it back into shape. **BE CAREFUL TO CHECK THESE SPACERS AGAIN BEFORE BUILDING THE BOOT COWL AND AGAIN BEFORE COVERING.**



**Photo 003**



**Photo 004**



**Figure FS1**

**LOG & INSPECTION SHEET FUSELAGE # 1**  
**Log sheet**

	FABRICATION AND ASSEMBLY TASKS	A	B	C	D
		Mfr Kit/Part/ Component	Commercial Assistance	Am-Builder Assembly	Am-Builder Fabrication
	Fuselage - 24 Listed Tasks				
	Task #				
F1	Fabricate Longitudinal Members	X			
F8	Assemble Fuselage Basic Structure				X

**Inspection point**

	INSPECTION ITEMS	BUILDER	ALTERNATE
1.1	Inspect powder coat on fuselage. Ensure complete coverage.		
1.2	Place a straight edge across LH and RH Boot Cowl Spacers. Ensure spacers are straight and flush to the straight edge.		
1.3	Ensure all fuselage tubes and gingerbread are straight and have not been damaged during transport to and from powder coat.		

## COMPONENT PRE-ASSEMBLY

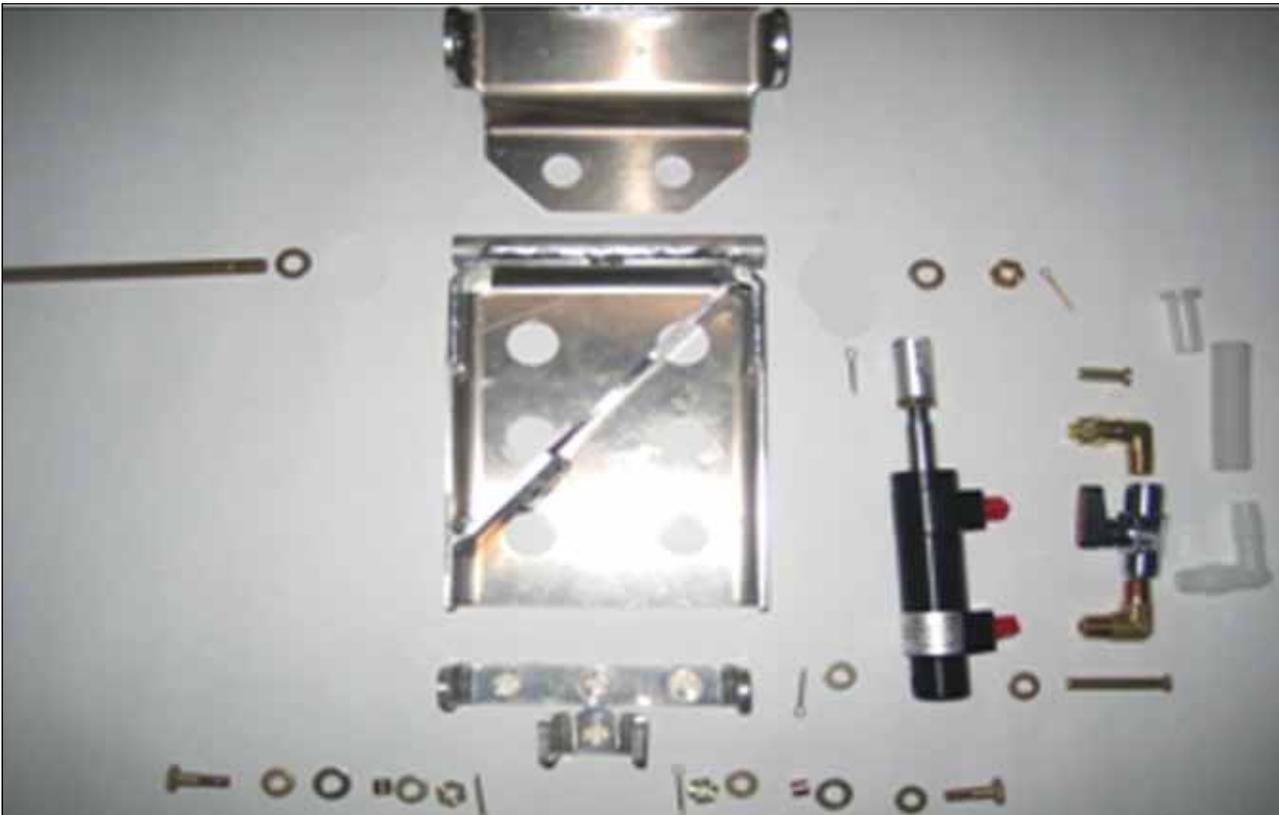
This step is in five parts:

- 1) rudder/brake pedals
- 2) electric trim
- 3) ELT antenna on upper baggage box
- 4) the rear baggage tray
- 5) the torque tube
- 6) fuel selector

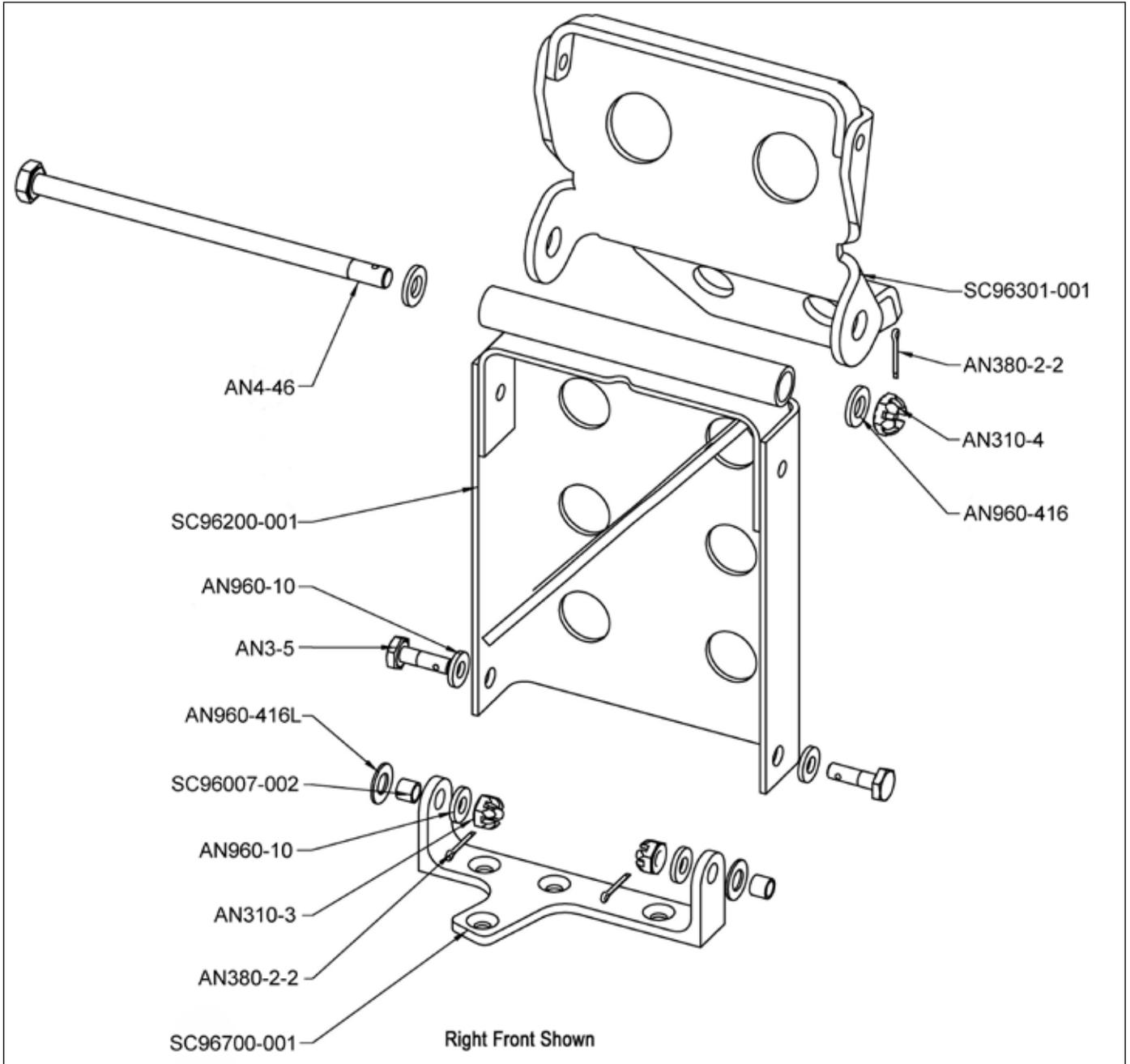
## SECTION 4

### STEP 1. RUDDER/BRAKE PEDAL ASSEMBLY

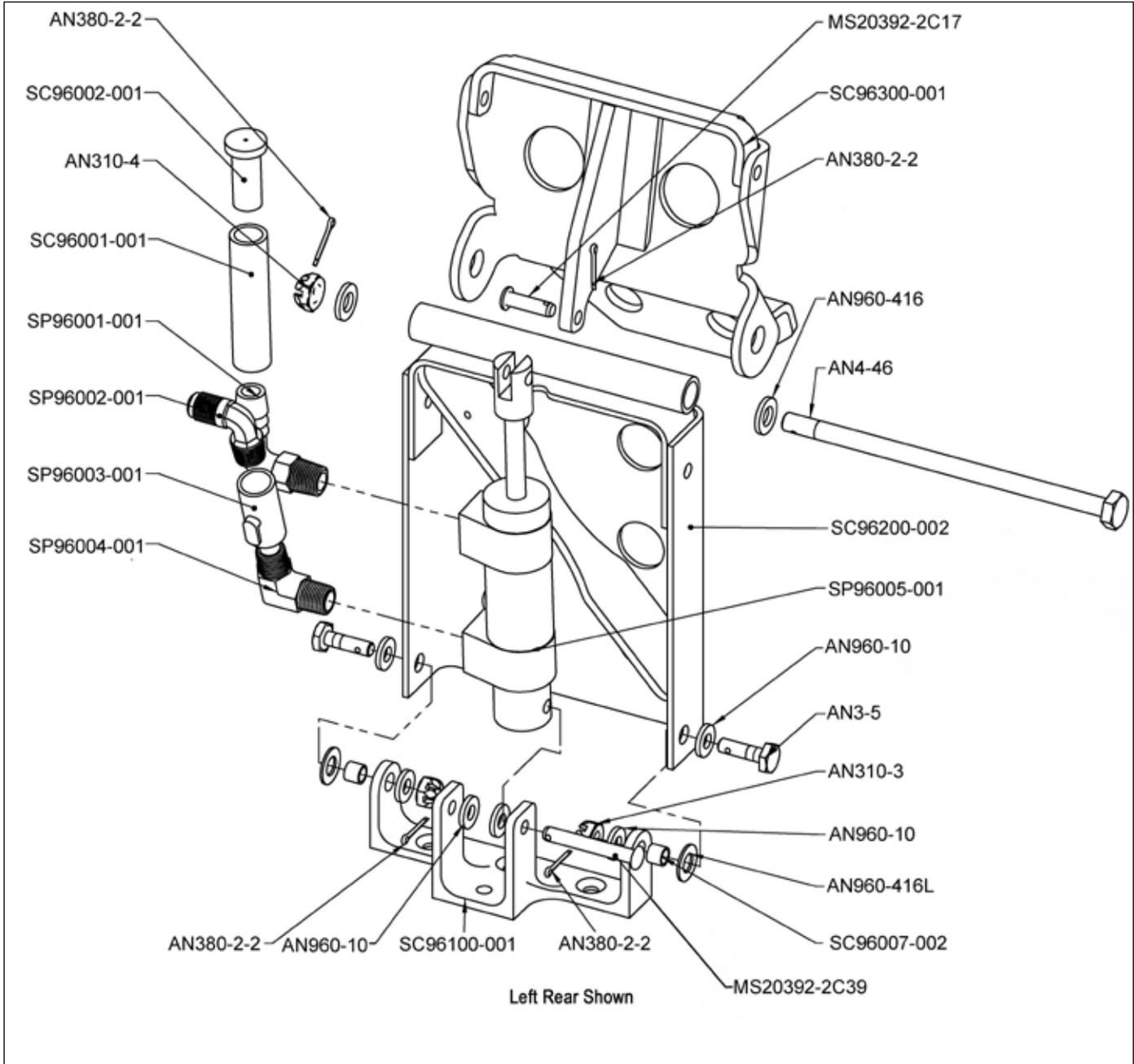
Examine the rudder pedals for any visible defects. Wipe parts clean with denatured alcohol. Gather all necessary hardware to assemble the rudder/brake pedals per Figure FS2 and Figure FS3. The assembly will be undertaken step-by-step below.



*Photo 005*



**Figure FS2**



**Figure FS3**

Install brackets to bottom of rear pedals per Figure FS3. Use a bit of white Lithium grease to lubricate the moving parts. The right rear pedal (SC96000-002) is shown in Photo 010. The assembly process is repeated for the left rear pedal.)

**Photo 006**

When attaching the pedal to the pedal base. Please note the location of the three washers. Lubricate with the white Lithium grease.

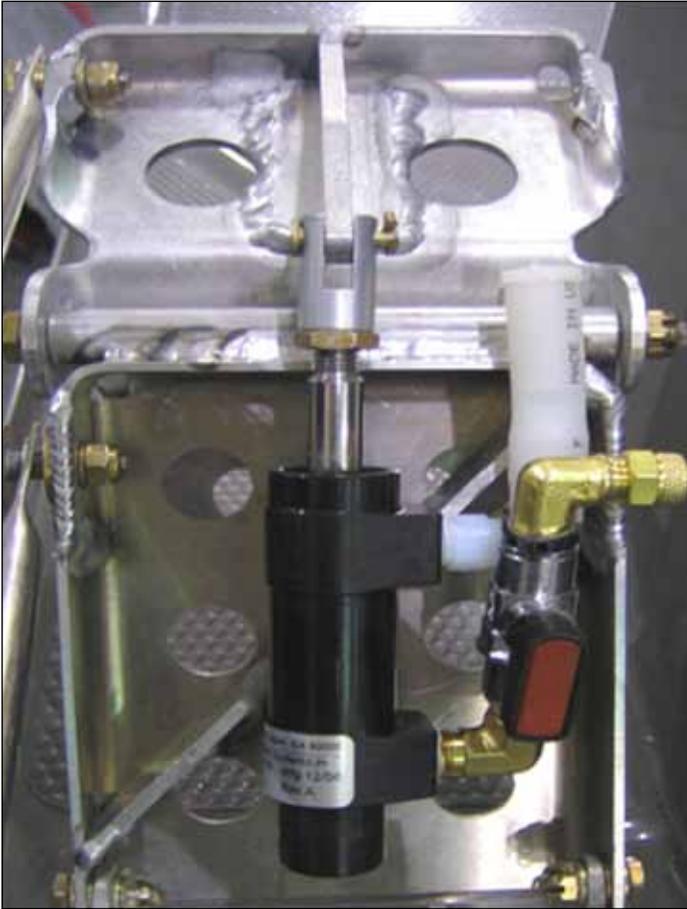
**Photo 007**

Set master cylinder to a length of 5 1/8" (from pin to pin per Photo 008) and tighten lock nut. Assemble fittings to master cylinder per Figure FS3.

**Photo 008**

Use Loctite 567 to seal all brake line fitting threads.

**Photo 009**

**Photo 010**

Attach master cylinder to top only. Bottom will be attached in later section.

Fasten the reservoir and fitting in place with a Zip tie.

This fitting (brass) should face inboard.

The red handle should be in the “down” position.

Next assemble the front rudder pedals in the same manner as the rear pedals. Photo 011 below shows the necessary parts. The right front pedal (SC96000-004) is shown. You will repeat the assembly process for the left front pedal.

**Photo 011**

The completed rudder pedal assembly should look like Photo 012 to the right.



**Photo 012**

Apply the non-skid tape (SP96006-001) in manner shown to the right.

The assembled rudder pedals are numbered as follows:

Right front assembly	SC96000-002
Left front assembly	SC96000-001
Right rear assembly	SC96000-004
Left rear assembly	SC96000-003

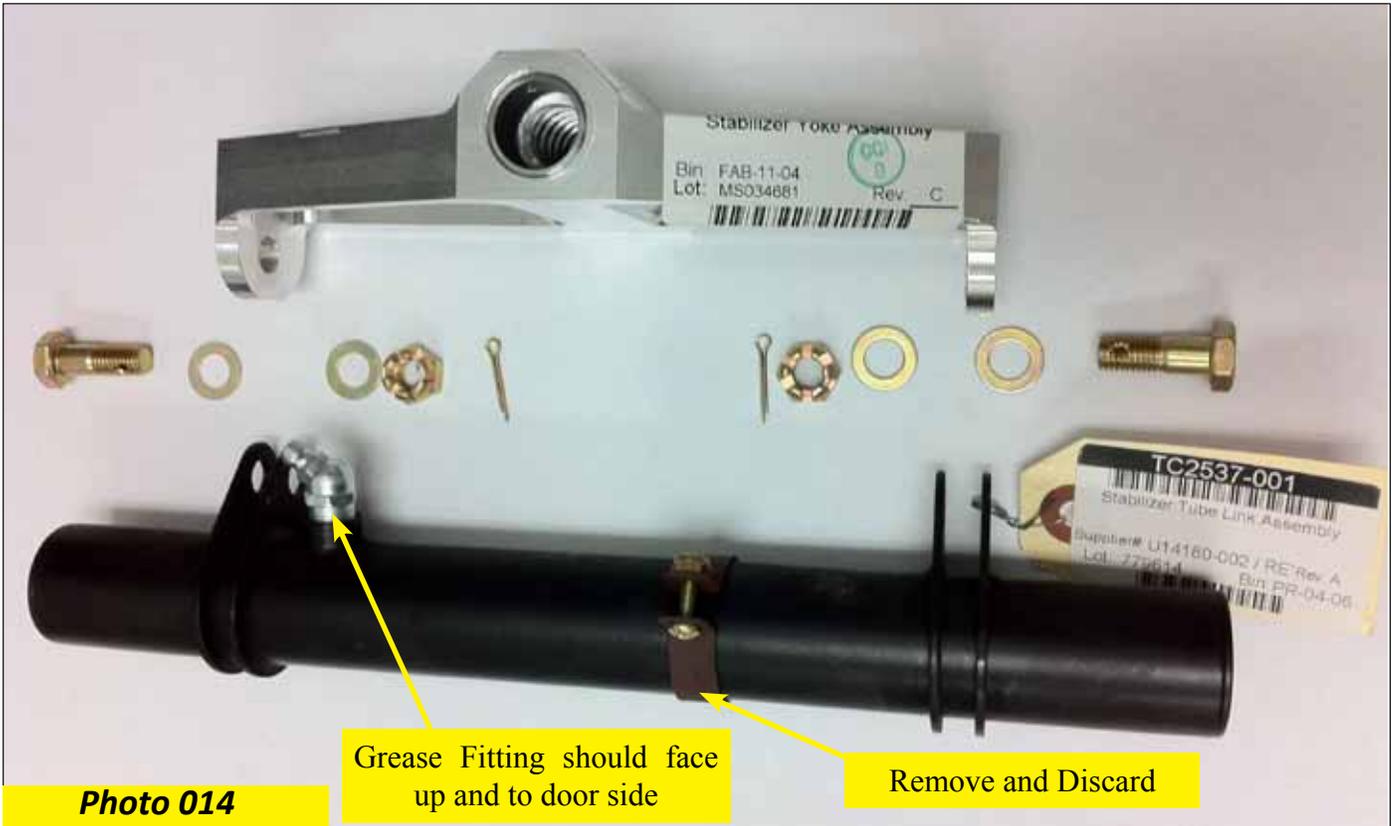


**Photo 013**

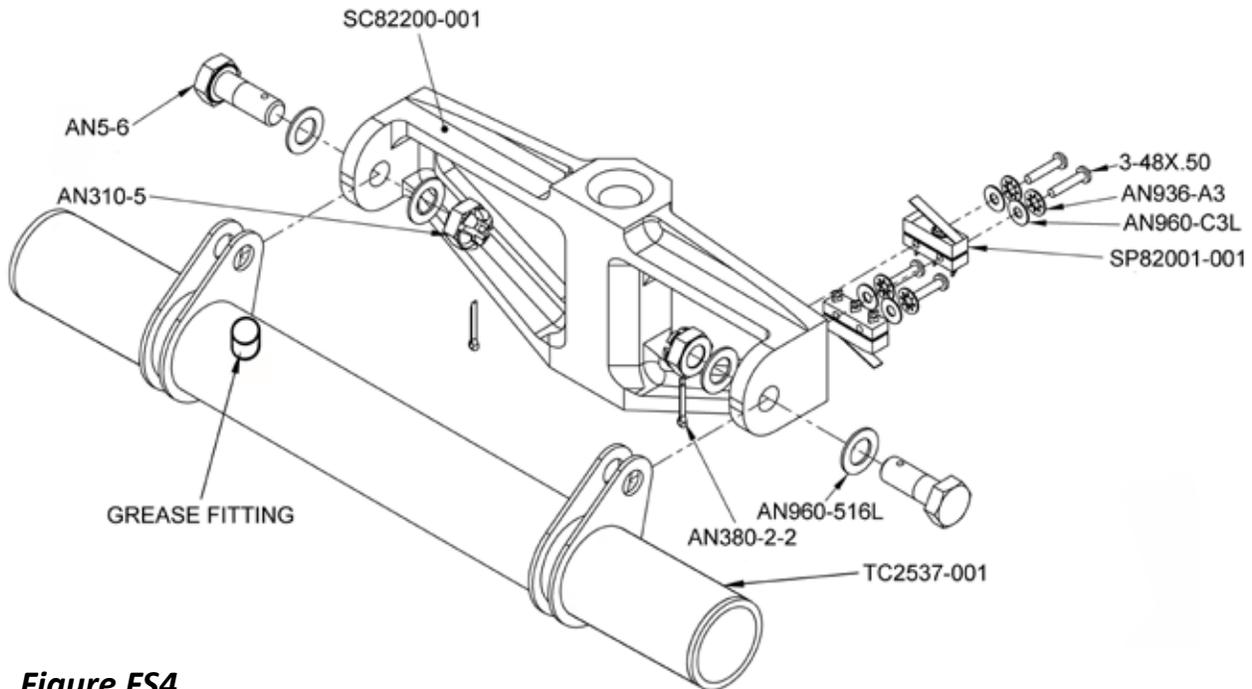
**SECTION 4**

**STEP 2. ELECTRIC TRIM JACKSCREW**

Assemble the parts needed for the stabilizer screw assembly per Figure FS4.  
Set the assembly aside until its installation later.



**Photo 014**



**Figure FS4**

**SECTION 4****STEP 3. ELT ANTENNA**

**IF YOU PURCHASED EXTENDED BAGGAGE, MOVE PAST THIS SECTION. ELT ANTENNA INSTALLATION WILL BE ADDRESSED IN THE EXTENDED BAGGAGE MANUAL.**

The builder may not install an ELT but it is recommended that this step be completed in case an ELT is installed later.

Start by pre-fitting the upper baggage compartment in the fuselage to ensure a proper fit. Then locate the antenna base, match drill and install hardware. The distance from the bottom of the upper storage tray and the bottom of the ELT bracket should be 3½" - 3¾". Use the following hardware for the attachment.

4 ea. AN526C632R6

4 ea. AN960-6

4 ea. AN365-632A

1 ea. SC91009-001



**Photo 015**

For clarity: the antenna whip points toward the ground (as depicted in the Photo 016 below) when the tray is installed later. Once the bracket and antenna are mounted, set the assembly aside until its installation in the fuselage later.

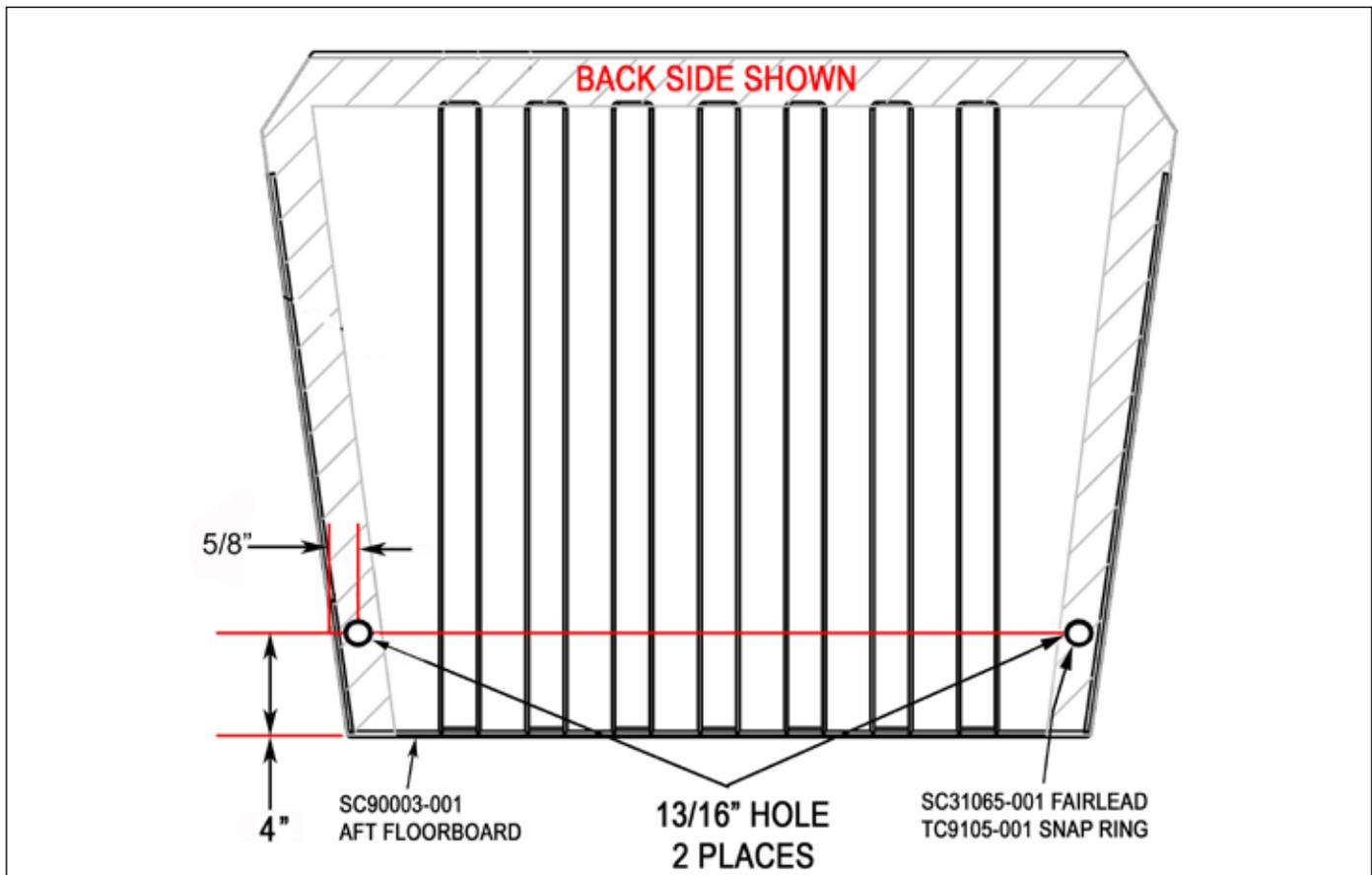


**Photo 016**

**SECTION 4**
**STEP 4. REAR BAGGAGE TRAY**
**IF YOU PURCHASED EXTENDED BAGGAGE, MOVE PAST THIS SECTION**

Drill and insert fairleads into the holes in the aft floorboard per Figure FS5. Secure the fairleads with spring clips. Apply a bead of silicone around the fairlead to keep them from vibrating.


**Photo 017**

**Photo 018**

**Figure FS5**

**SECTION 4**

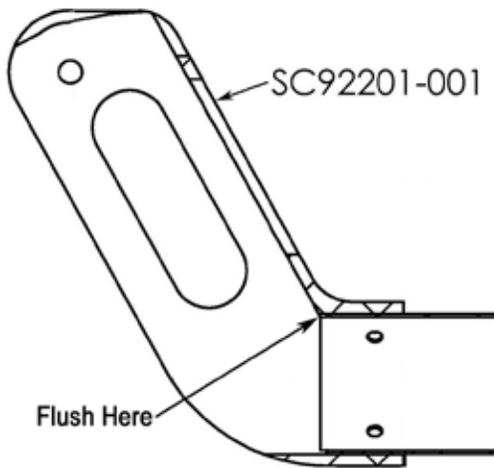
**STEP 5. TORQUE TUBE PRE-ASSEMBLY**

Start this step by gathering the parts and hardware to assemble the torque tube.

- AR- RM0568-004 Loctite 271, Red
- 1 each SC31065-001 Rib Grommets
- 1 each SC92101-001 Tube
- 1 each SC92201-001 Torque Tube Mast
- 1 each SC92201-002 Torque Tube Mast
- 12 each HDW-CR3213-5-3 Rivet, Cherry Max
- 1 each TC9105-001 Snap Ring

Test fit both front and rear control stick masts to the torque tube. Front top edge of tube should be flush with the top of the hole in the mast per Figure FS6. Match drill using a #20 drill bit and Cleco the 6 front mast holes. Remove the tube and apply a thin coat of red Loctite to the inside of the front control stick mast and reinsert torque tube into mast. Insert a Cleco to hold the part.

Install Cherry Max rivets(HDW-CR3213-5-3) in the front control stick mast per Figure FS7. Do not remove the Cleco until you are ready to place the rivet.



**Figure FS6**



**Photo 019**



**Photo 020**



**Photo 021**



**Photo 022**

Ensure surface being used is FLAT when completing the next step. Insert torque tube into rear mast and ensure both front and rear masts are laying flat on the work surface. Verify the distance between masts per Figure FS7 (center of one hole to the center of the other should be 30 inches plus/minus 0.020 inch). Carefully match drill and Cleco 6 holes in the torque tube using the rear mast as the template.

**DO NOT RIVET THE REAR MAST AT THIS TIME.**

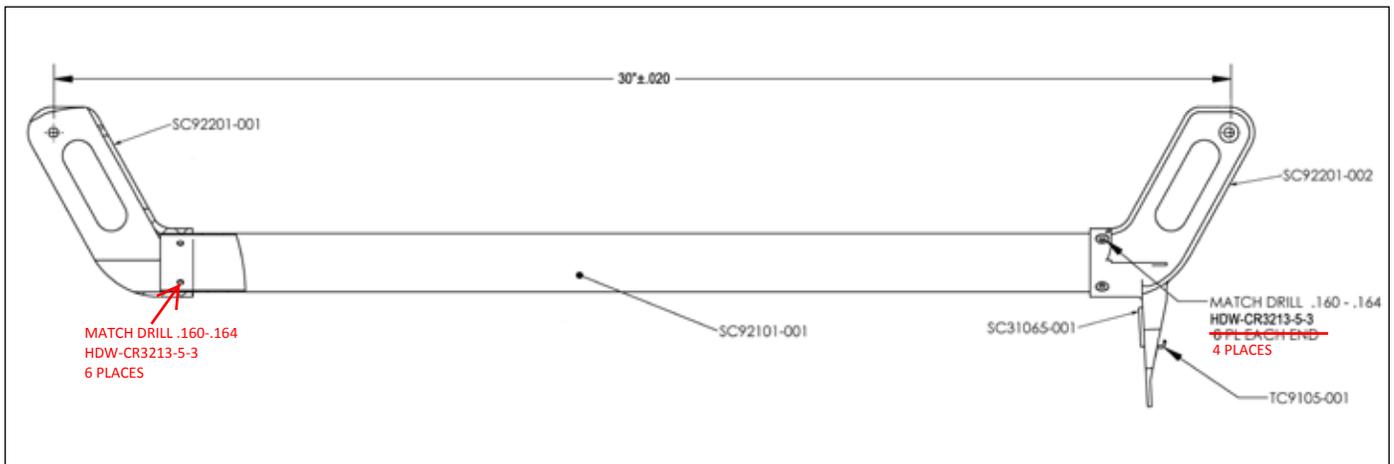
Lastly, install part numbers SC31065-001 and TC9105-001 per Figure FS7.



**Photo 023**



**Photo 024**



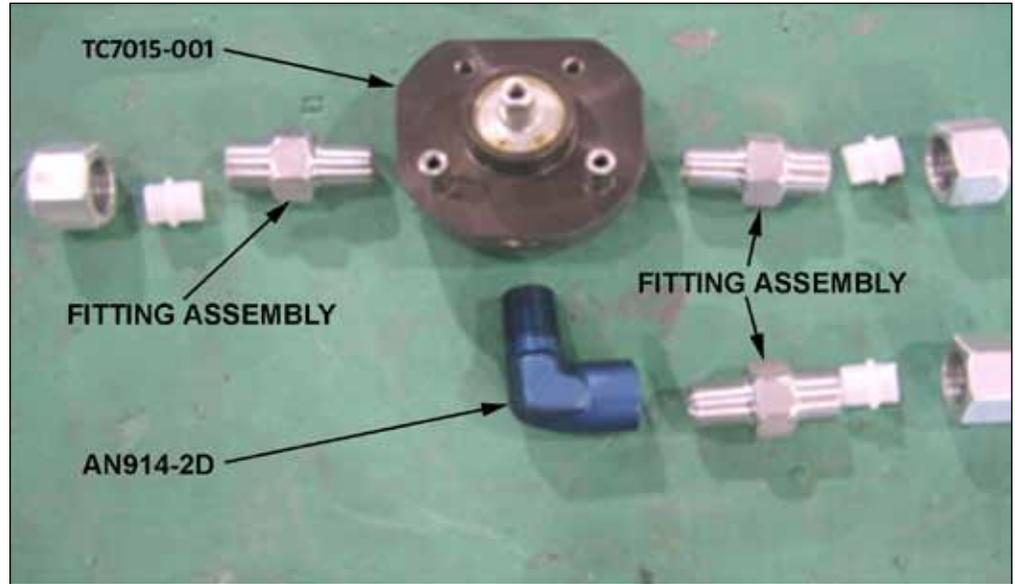
**Figure FS7**

**SECTION 4**

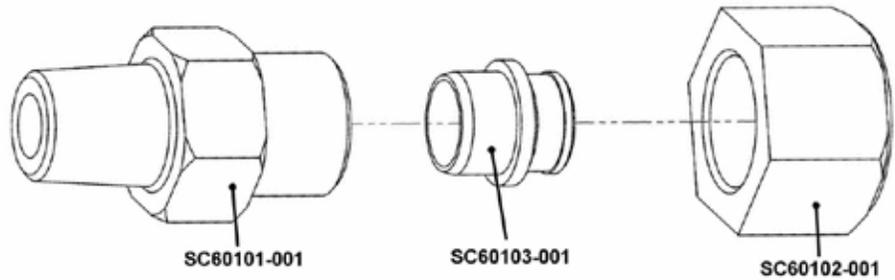
**STEP 6. FUEL SELECTOR**

Assemble parts per Photos below for the fuel selector valve.

Use fuel lube (EZ-TURN 5oz., fuel resistant lubricant) to assemble pipe thread fittings.



The parts shown in Photo 025 will make up compression fitting assembly SC60100-001.



**Photo 025**



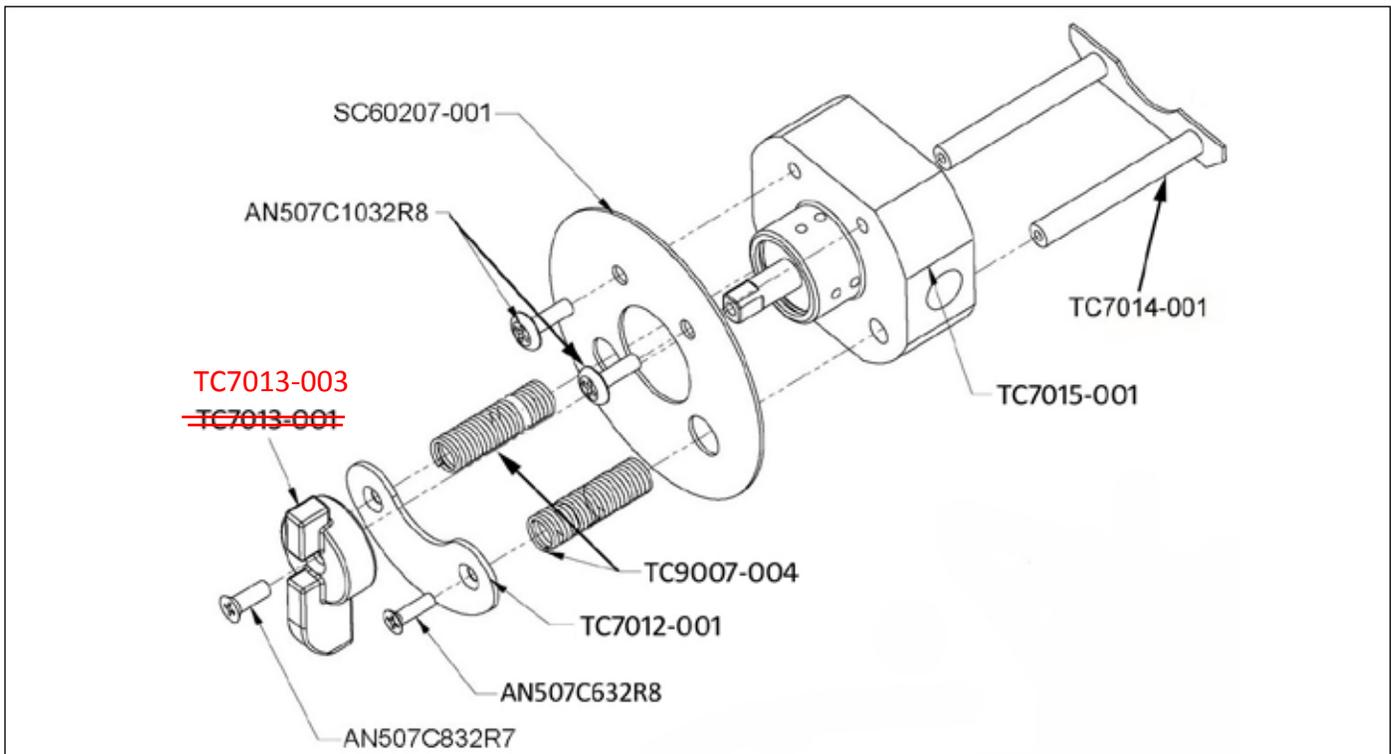
**Photo 026**

Install the fuel selector and check for proper clearance around fittings (1/8" minimum). Ensure plunger is secured with masking tape when fuel selector is installed. Use tape to seal open ends of fittings until fuel lines are installed.

Mount the fuel selector to the fuselage (through the plate welded to the fuselage side) using the 2 screws set out in Figure FS8. **ANY 1032 SCREW WILL WORK FOR THE TEMPORARY MOUNTING OF THE FUEL SELECTOR VALVE. THESE SCREWS WILL BE REMOVED WHEN FINAL ASSEMBLY IS DONE IN THE FINISH MANUAL.**



**Photo 027**



**Figure FS8**

**LOG & INSPECTION SHEET FUSELAGE # 2**

**Log sheet**

	FABRICATION AND ASSEMBLY TASKS	A	B	C	D
		Mfr Kit/Part/ Component	Commercial Assistance	Am-Builder Assembly	Am-Builder Fabrication
	Fuselage - 24 Listed Tasks				
	Task #				
F4	Fabricate Control Yokes/Sticks	X .5			X .5
F5	Assemble Control Yokes/Sticks			X	
F6	Fabricate Flt Control Push Pull Tubes/ Cables	X			
F7	Assemble Flt Control Push Pull Tubes/ Cables			X	

**Inspection point**

	INSPECTION ITEMS	BUILDER	ALTERNATE
1.4	Ensure torque tube rivets are properly installed.		
1.5	Rudder pedals assembled with correct hardware per figures.		

You're done with pre-assembly tasks for the moment. I'm sure the fuselage has been calling to you. Let's scratch that itch and add some parts to that naked fuselage!

## SECTION 5 BOTTOM PULLEY

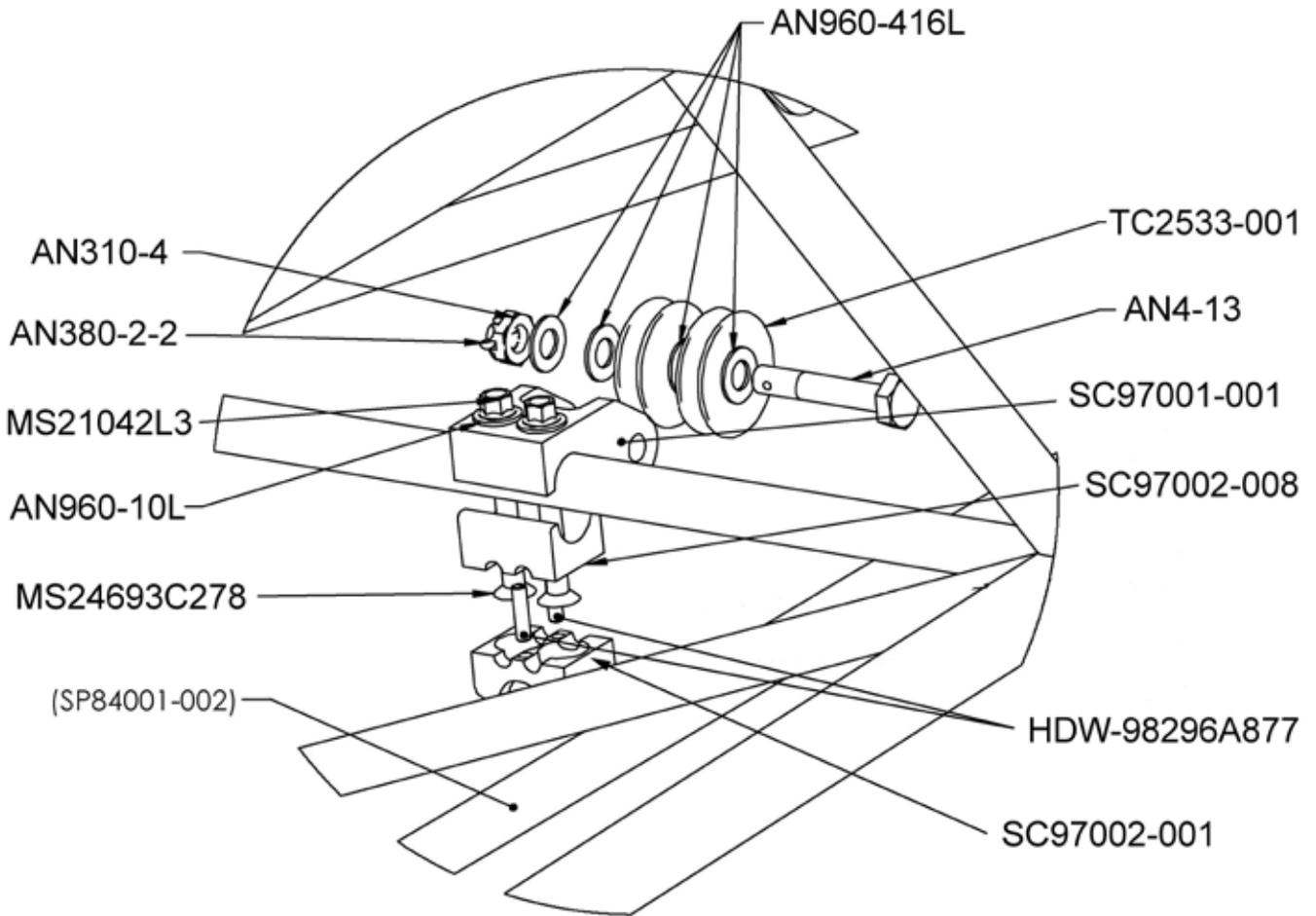
Assemble the parts needed for the elevator cable pulley in accordance with Figure FS9. Then install the pulley bracket to the aft end of the fuselage at Station 153 (Station 153 is 153 inches behind the firewall).



**Photo 028**

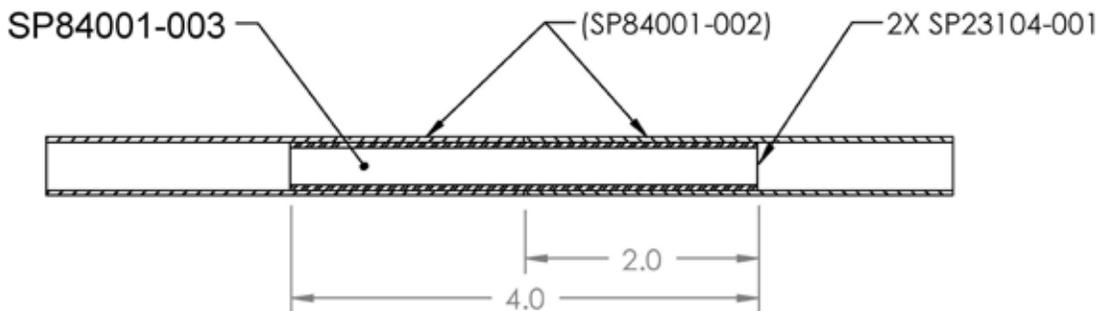


**Photo 029**



**DETAIL A**

ELEVATOR PULLEY ASSEMBLY  
 DETAIL A IS LOOKING AFT



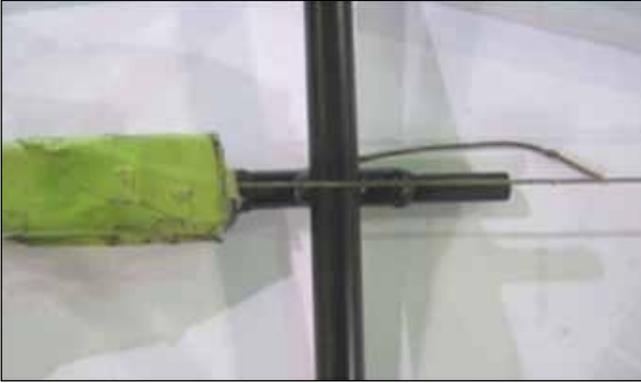
**SECTION B-B**

BOTTOM STRINGER SPLICE ASSEMBLY

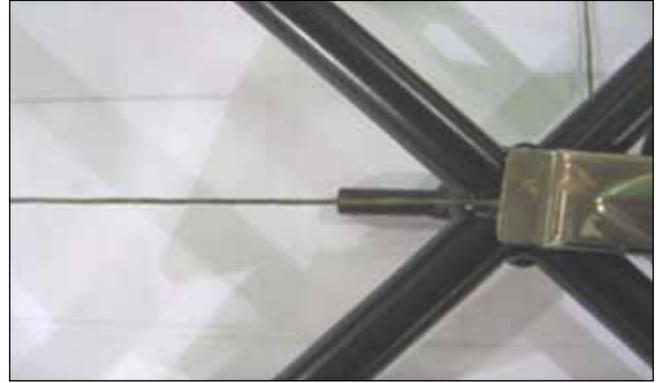
*Figure FS9*

## SECTION 6 BOTTOM STRINGER

First we're going to setup a string line to help align the bottom stringer blocks as they are placed. Wrap several layers of friction tape around the aft stringer location to help hold the string that you will clamp in place with a spring clamp. Pull string to the forward stringer location and clamp in place. Ensure string is tight and centered over the stringer locators.



**Photo 030**



**Photo 031**

Slide the two bottom stringer tubes together per Figure FS9 Section B-B to become one long tube. You may have to give the end of tube a little "influence". If you do need to persuade the fit, place a block of wood over the end of the tube and strike the block with a hammer. Sometimes a bit of twisting action goes well with the pulling together (by hand).

Next, it is necessary to place the bottom stringer into the fuselage to mark for cutting to the proper length. Place the bottom stringer onto the forward locator and mark the location to cut the aft end of stringer. Cut the stringer with a die grinder using a cutoff blade. Wear gloves and goggles during the cut. Use caution, as the tube end will be hot after the cut.



**Photo 032**

Apply a bead of Methacrylate adhesive to the forward end of the bottom stringer (inside) and a little on the fuselage tube. Slide the bottom stringer over the fuselage tube. It's OK to leave a small bead showing but clean off any gross excess Methacrylate before it hardens. Make the joint look neat.



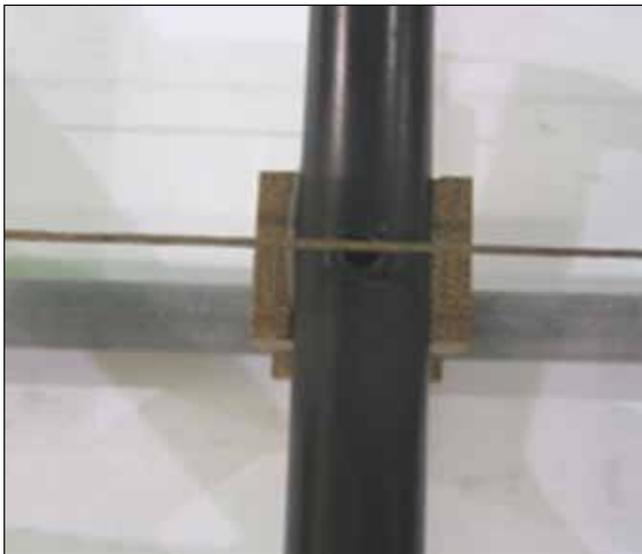
**Photo 033**



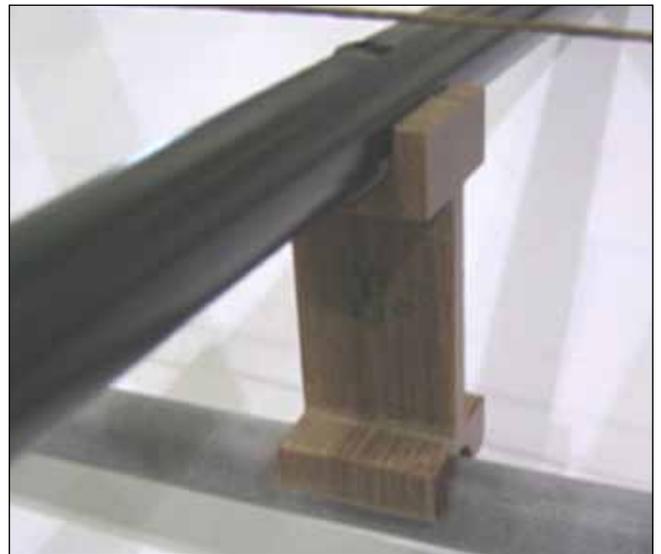
**Photo 034**

## SECTION 7 ELEVATOR CABLE FAIRLEADS BLOCKS

Next the Delron blocks (otherwise known as Elevator Cable Fairleads) get glued to the bottom of the fuselage. Examine Figure FS10 to determine the correct part number for each block. Work from the forward to the aft end of the fuselage. Place each block into position on fuselage. Ensure that the block is centered on the string. Once you have the spot identified scuff the block and the powder coat on the fuselage with 180 grit sandpaper and apply adhesive to top of the block and press it into place. Use a bungee cord to hold the block in place while the Methacrylate cures. **NOTE: THE CARBON CUBE EX FUSELAGE IS SLIGHTLY DIFFERENT THAT THE CARBON CUB SS FUSELAGE IN THAT THERE IS AN EXTRA CROSS TUBE WHERE THE SECOND BLOCK (SC97002-006) WILL FIT, YOU WILL NEED TO REMOVE THE EXCESS MATERIAL AS SHOWN IN FIGURE FS10.**



*Photo 035*



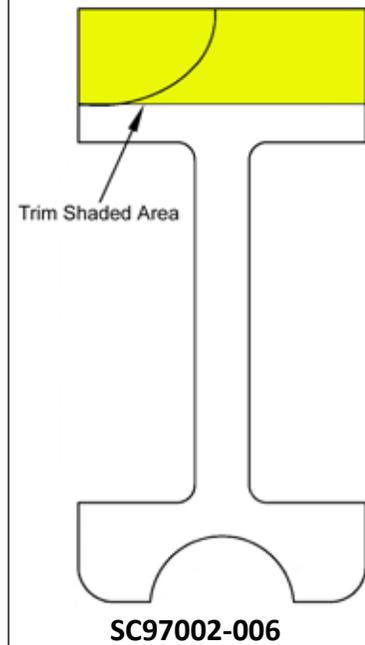
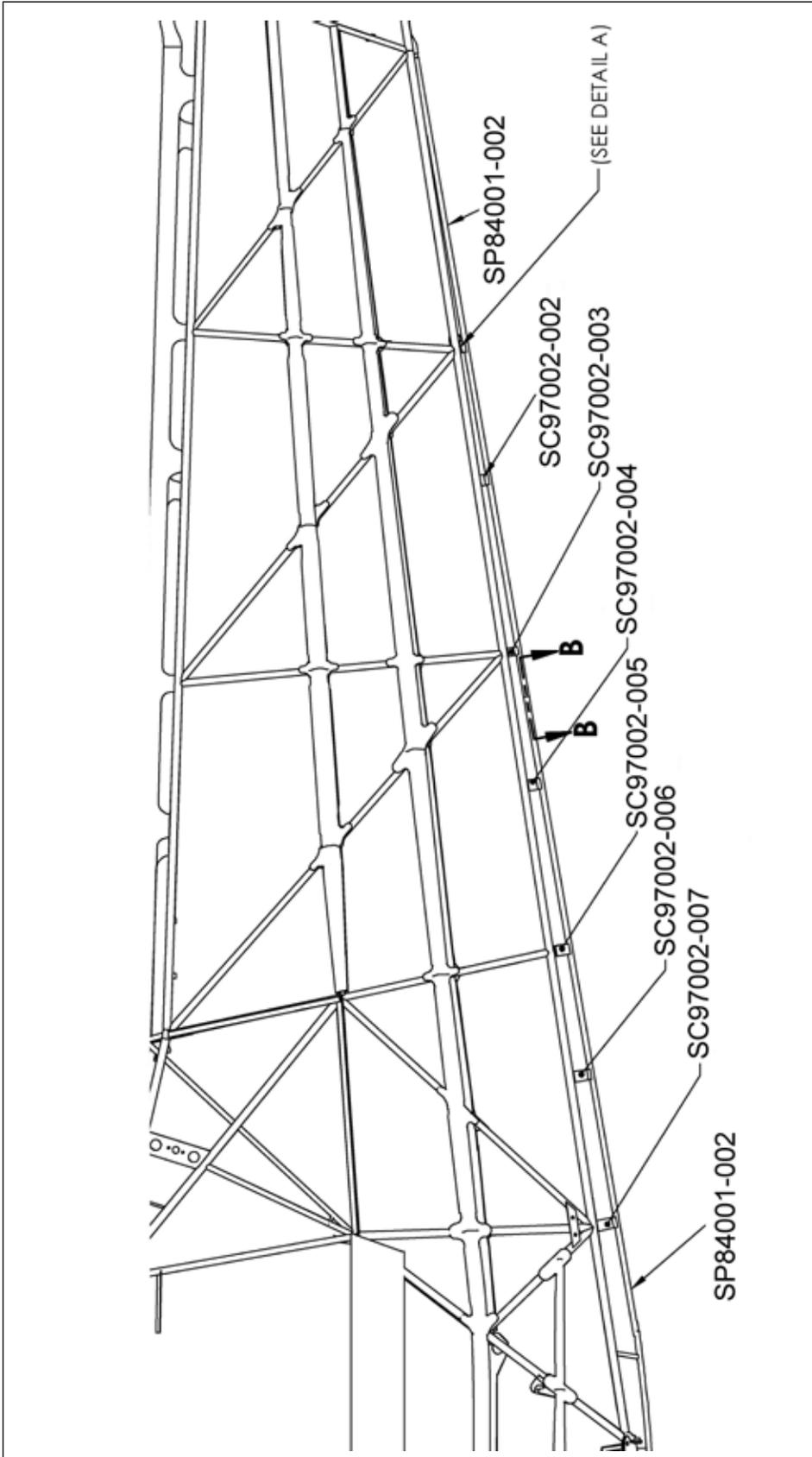
*Photo 036*



*Photo 037*



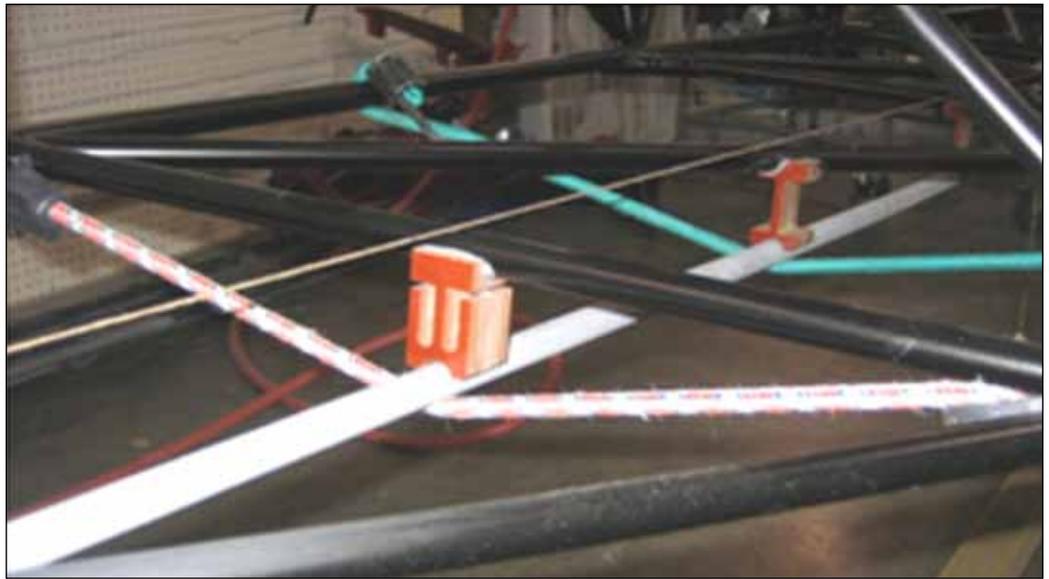
*Photo 038*



**Figure FS10**

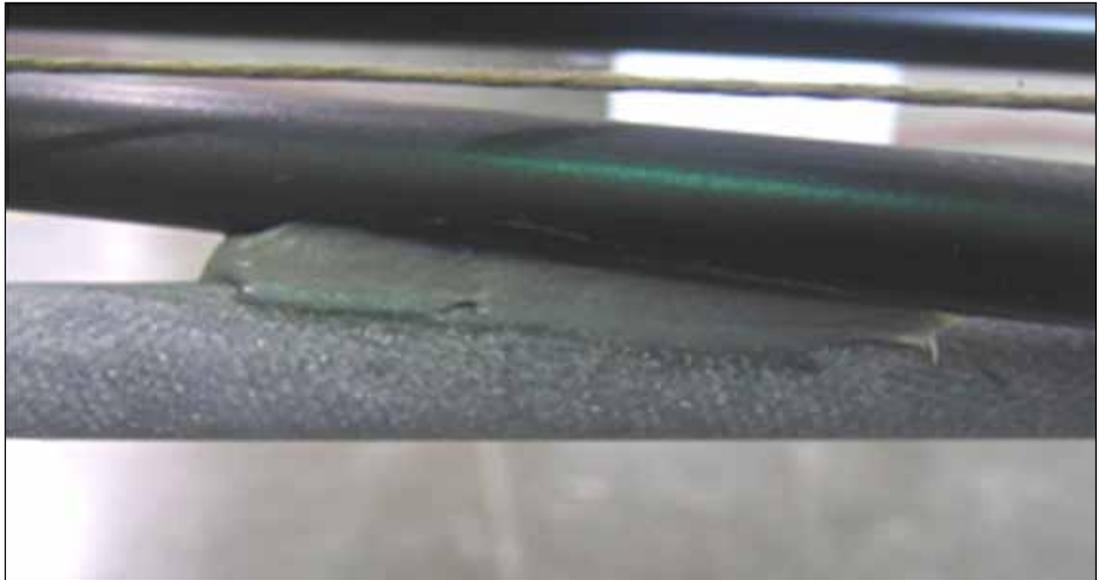
Use the string to verify that each block is in the correct position. Continue to glue blocks into place. Don't upset the last one you set as you align the next. This isn't tricky – it is only a matter of using care as you proceed. Use a bungee cord under each block.

Once the Methacrylate at the top of each block has cured apply a bead of adhesive to each side of fuselage tube on top of each block. Smooth the intersection between the block and the tube with a swipe of your finger. Remember: neatness counts.

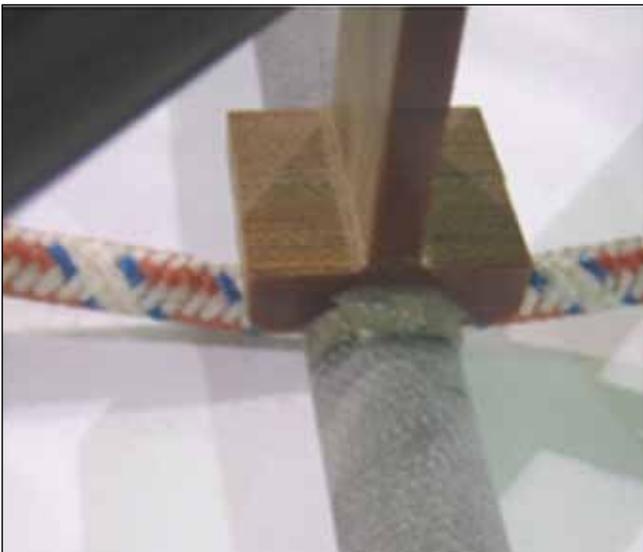
*Photo 039**Photo 040**Photo 041*

Apply Methacrylate to fill the space where the angled crossbar passes over the bottom stringer. Lengthwise on the fuselage, this is between the elevator pulley and the aft end of the stringer. For a neat appearance, smooth the adhesive with your finger or a tongue depressor or the stick from that last Dove Bar (be sure its clean).

Secure the bottom stringer to the bottom of the blocks with Methacrylate adhesive. Exception: **do not glue the stringer to the bottom of the elevator pulley block**. Also, while the glue gun is handy, place a small bead of Methacrylate across the intersection of the two bottom stringer tubes to assure that they cannot slip apart.



*Photo 042*



*Photo 043*

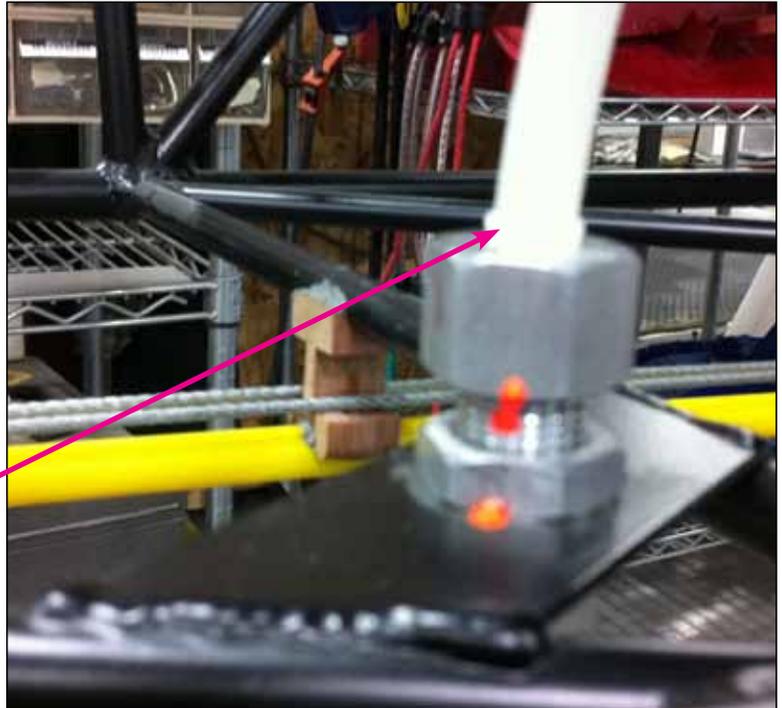


*Photo 044*

**SECTION 8 FUEL LOW POINT DRAIN**

Use Figure FS11 for parts callout and assembly. Use fuel lube on the fittings. Then clamp the outlet into place using a metal "L" shaped bracket Photo 045. Check the position vertically, the fitting needs to be adjusted as shown in Photo 046. You can check this by using a straight edge between bottom stringer and lower longeron to simulate the fabric being stretched across the bottom. The fitting should protrude slightly below the fabric/straight edge.

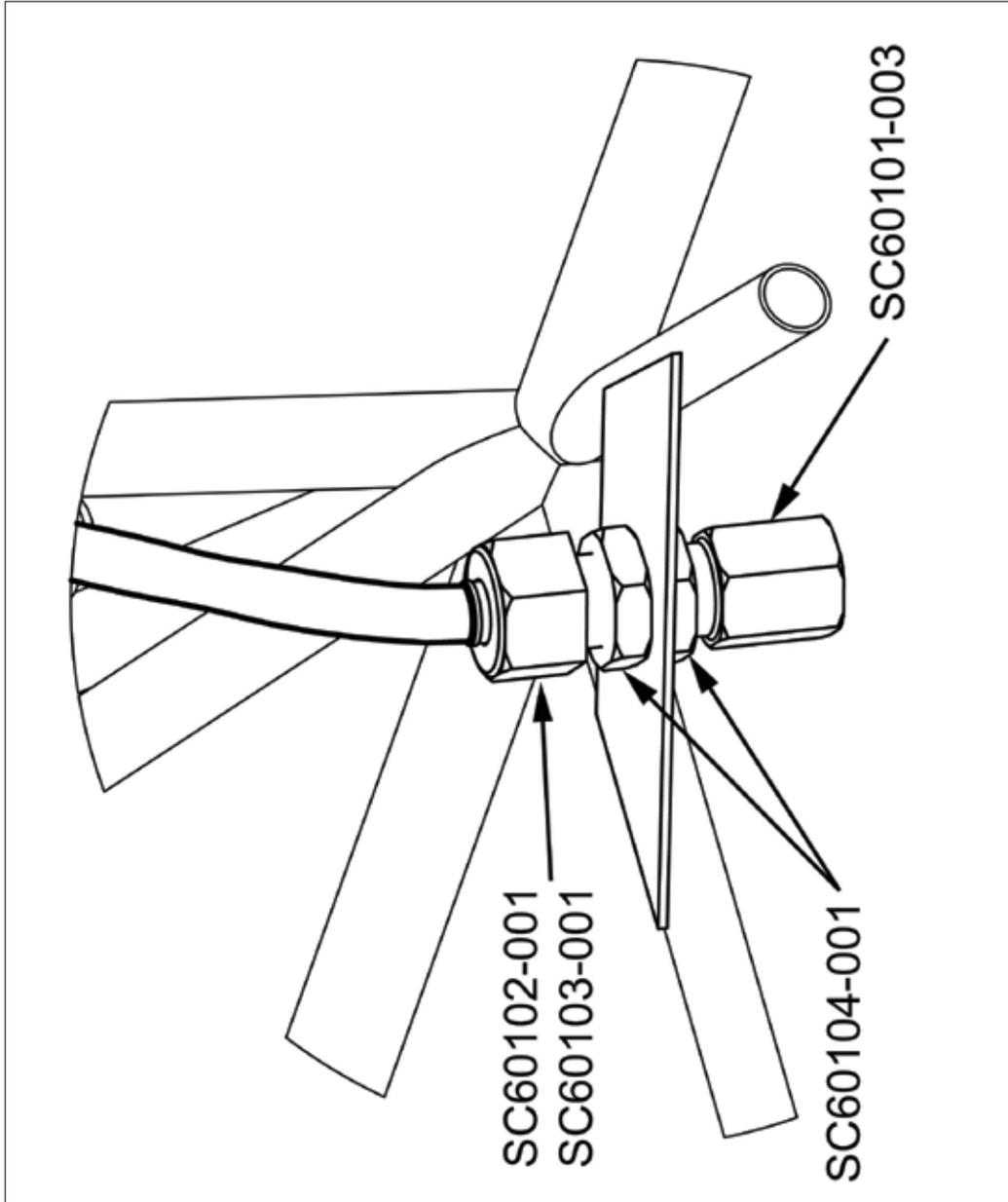
Ensure sleeve is in nut before assembly



**Photo 045**



**Photo 046**



**Figure FS11**

## SECTION 9 UPPER BAGGAGE INSTALLATION AND SIDE PANEL FITTING

**IF YOU PURCHASED EXTENDED BAGGAGE,  
MOVE PAST SECTION 9, YOU WILL INSTALL  
THE EXTENDED EXTENDED BAGGAGE  
BEFORE SECTION SECTION 14**

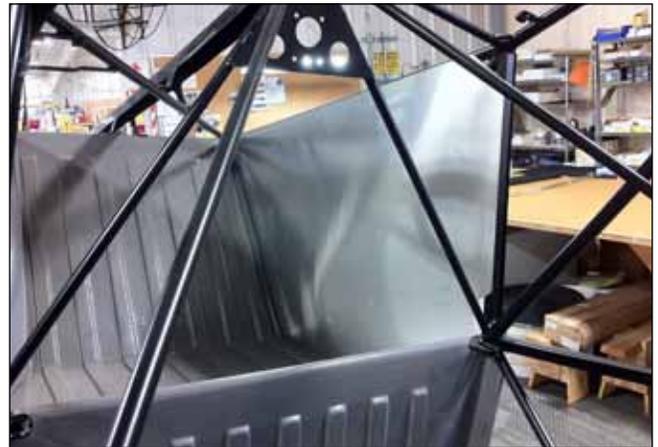
Place the rear baggage compartment tray (SC90001-001) that you worked on earlier onto the fuselage. Using Methacrylate to bond the front and rear of the baggage area. Secure the bonded seams with masking tape until cured. Then, test fit the side panels SC90004-001 to the aft baggage compartment.

The forward edge of the side panels should be flush with the forward edge of the square tube where the side window frame is attached.

The top edge of the side panel should meet the centerline of the top fuselage tube.

Ensure top corners of the aft cargo compartment will not interfere with the fabric. Use a die grinder as needed to ensure clearance.

Use shears to trim any extra material. Once trimmed, smooth any sharp edges (using a file, ScotchBrite, etc). Don't worry about fastening these panels right now. Hold them in place with some masking tape. The panels will be fastened after the next section.



**Photo 047**



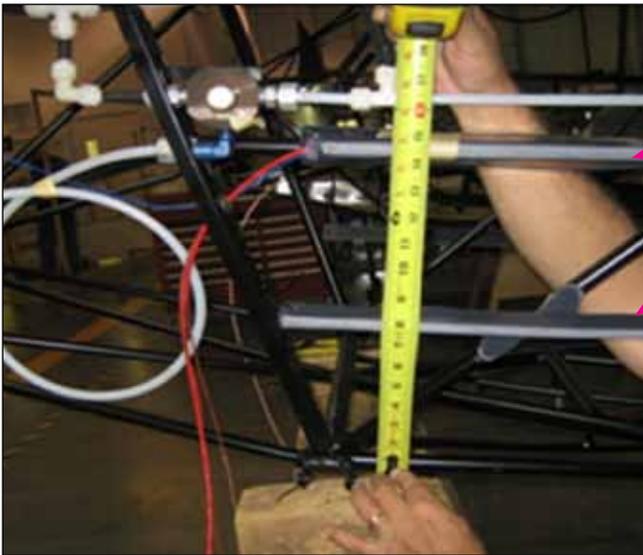
**Photo 048**



**Photo 049**

**SECTION 10 STRINGERS**

In this section we are going to place the stringers identified in Figure FS12. Using the measurements shown in the following pictures, position the stringers. Left side position measurements are shown. The right side positions are to be the same as the left. Use your 3-inch spring clamps to hold the stringers in place. Ensure that all of the stringer tabs are located over a tube. Once all stringers are in place, use a contrasting marker (silver or white) or masking tape to identify the location at each tube crossing.

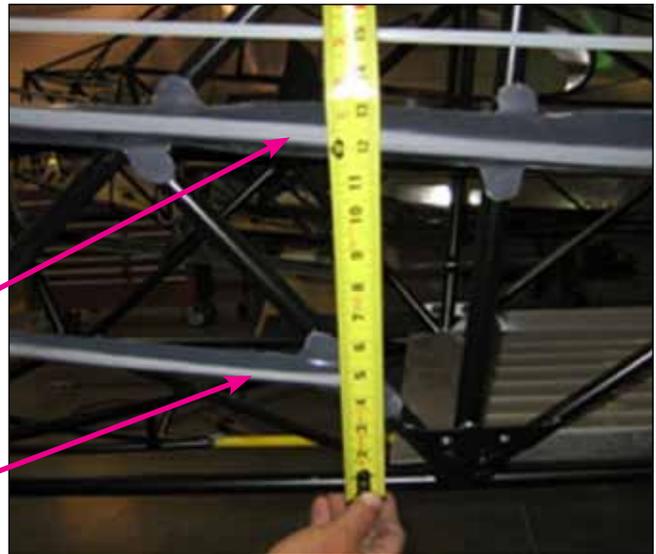


**Photo 050**

**Photo 050** is taken near the fuel selector

This is SC83101-001 14½ inches

This is SC83106-001 7 5/8 inches



**Photo 051**

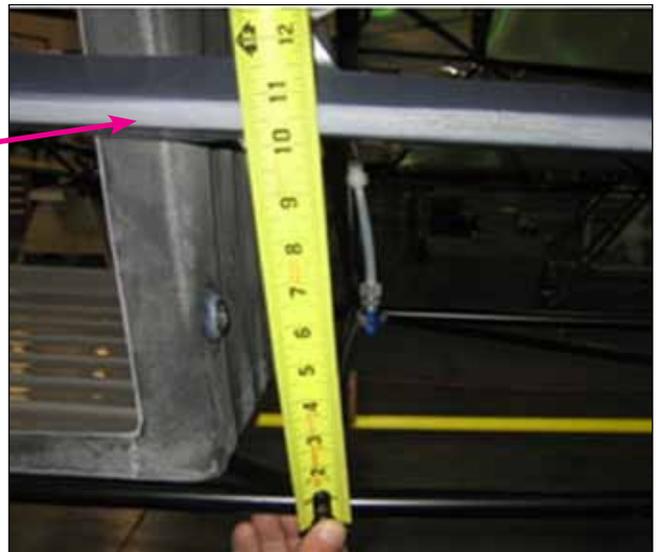
**Photo 051** is near the leading edge of the lower baggage tray

This is SC83101-001 12 3/8 inches

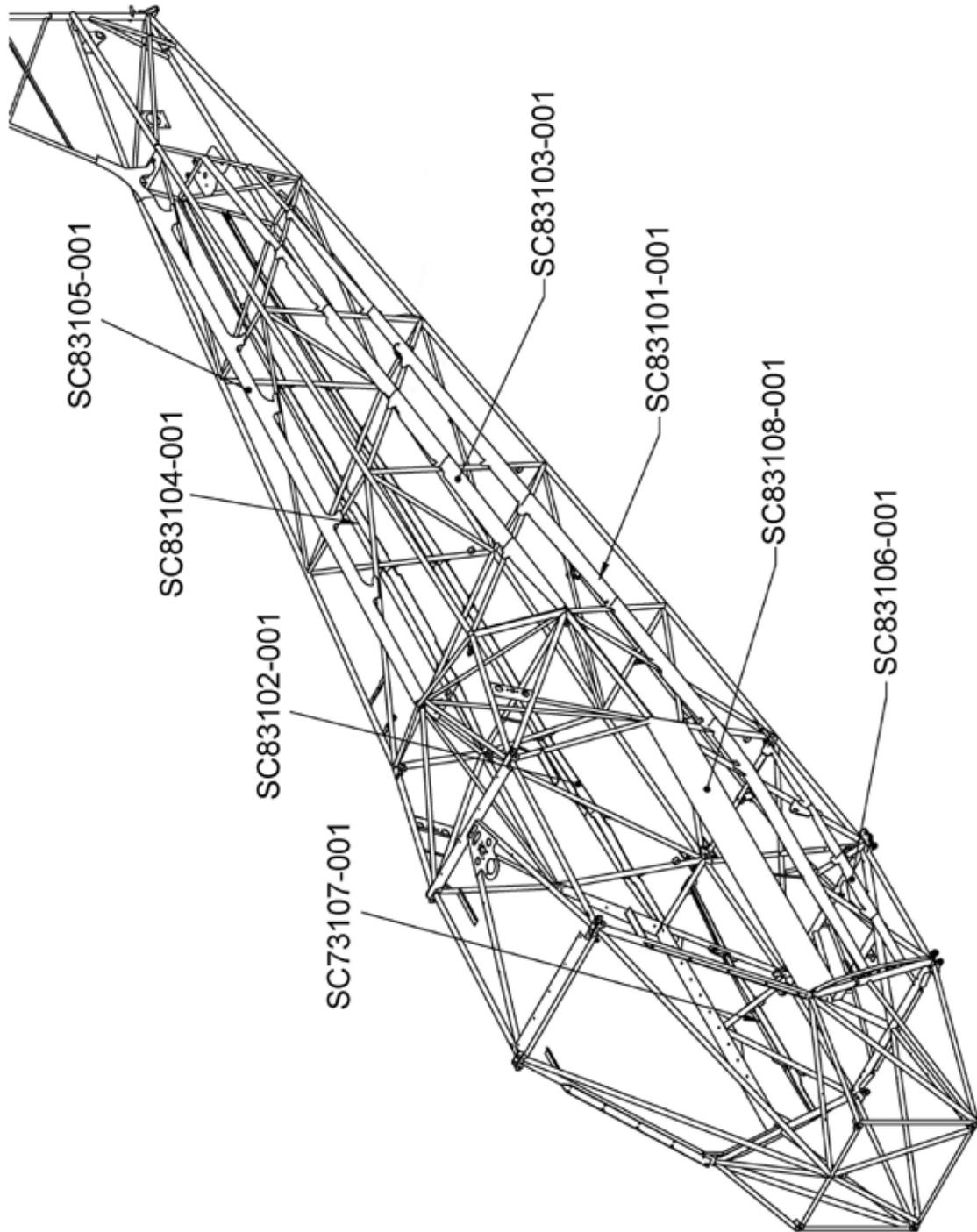
This is This is SC83106-001 4¾ inches

**Photo 052** is near the aft side of the lower baggage tray.

This is SC83101-001 10 3/8 inches



**Photo 052**



YOU MAY NOTICE THAT THERE IS A TOP STRINGER SC83105-001 THAT WAS NOT ADDRESSED IN THIS SECTION. WE'LL INSTALL THIS STRINGER LATER.

**Figure FS12**

**Photo 053**

Sand the aft end of stringer to allow a smooth transition to the fuselage. To achieve this you will need to sand the inside of stringer as shown in Photo 053 & Photo 054.

**Photo 054****Photo 055**

Use an air nozzle to remove all the loose particles and dust from the stringers.

Use a ScotchBrite pad to roughen the surface wherever the stringers will be glued to the fuselage tubes. Methacrylate adhesive will not adhere well to a smooth glossy surface. If the stringer spans from a horizontal start tube to a horizontal start tube, make sure the stringer is straight between the tubes.

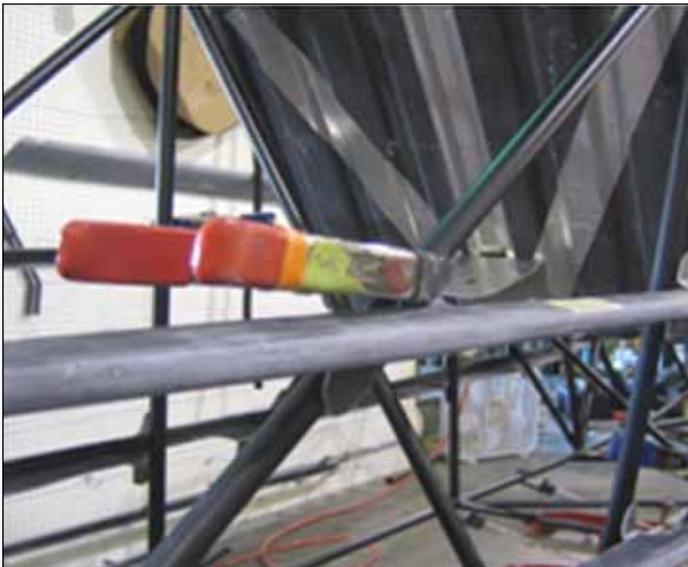


**Photo 056**



**Photo 057**

With the stringers in their proper locations on the tubes mark any area that will need to be trimmed for proper fit.



**Photo 058**



**Photo 059**

**IF YOU PURCHASED THE EXTENDED BAGGAGE KIT, YOU WILL WANT TO TAPE THE DOOR FRAME INTO POSITION AND POSITION THE STRINGER AS SHOWN IN Photo 059. IF YOU FAIL TO PRE FIT THE DOOR FRAME BEFORE GLUING THE STRINGER IN PLACE. THE DOOR FRAME MAY NOT FIT.**

**Photo 060**

Apply Methacrylate to the inside of the 4 stringers at the aft mounting tubes. Be sure that you use enough Methacrylate to embed the tube in the stringer. Use masking tape to hold the stringers in place.

Moving down each stringer, pull each pair of stringer tabs away from fuselage and apply Methacrylate. Press the tab, the Methacrylate and the tube together. Use a rag or paper towel to wipe away any excess. Use masking tape and/or spring clamps as needed to secure the tabs while the Methacrylate cures. Keep the Methacrylate at hand as you'll be using it in the next section.

**Photo 061**

There is a happy amount of pressure between the stringers and the tubes. If there is too little the tabs will not stick to the tubes. Too much pressure on the tabs will cause the stringers to bow. Be sure that the stringers are straight and/or have proper curves.

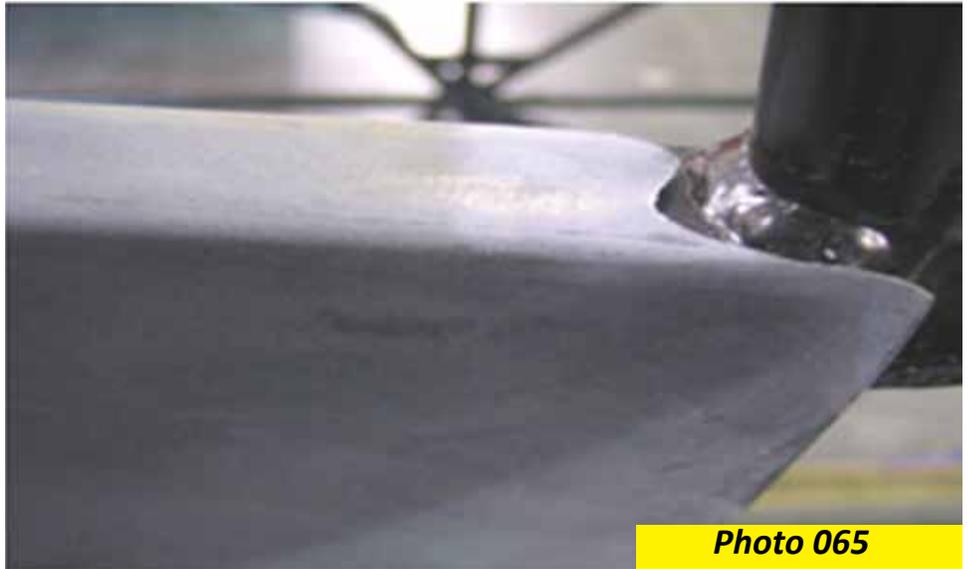
**THE METHACRYLATE ADHESIVE CAN BRIDGE UP TO 3/8", SO DO NOT FORCE EVERY TAB ON THE STRINGER TO FIT PERFECTLY AGAINST THE FUSELAGE TUBE.**

**Photo 062**

The stringers form the exterior shape of the Carbon Cub fuselage. You are trying to achieve smooth transitions between the tubes and the stringers. As such, any unusual curvature in the stringers will be undesirable, as it will show later.

You may notice that there is a top stringer that was not addressed in this step. We'll install the top stringer later.

**Photo 063****Photo 064**

**Photo 065**

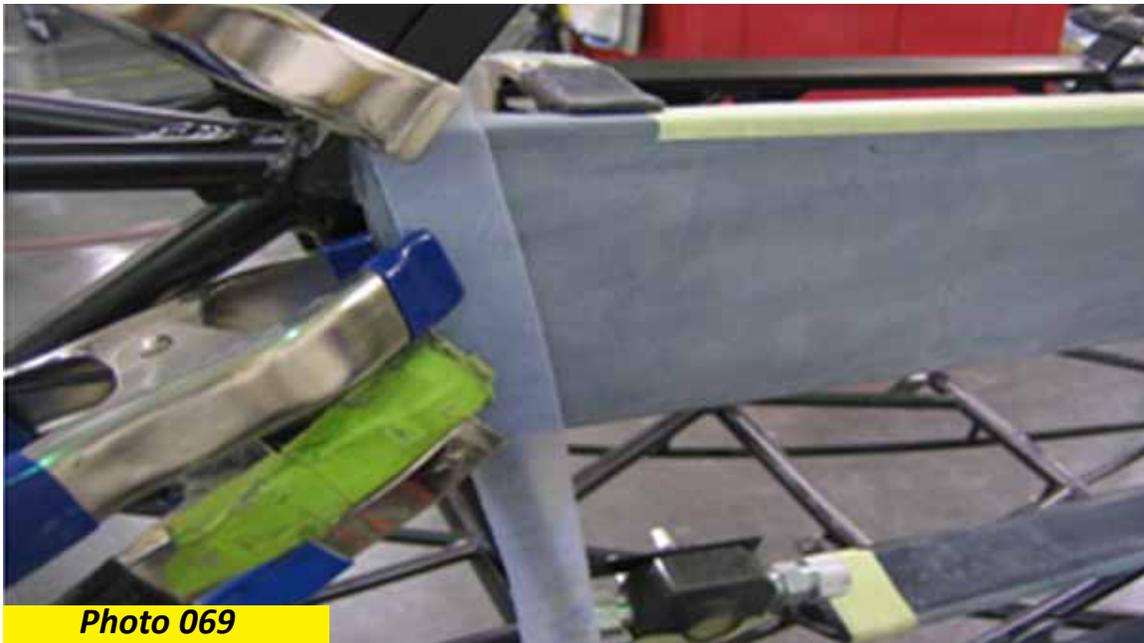
The next stringer to be placed is SC83108-001 per Figure FS12. It is placed at the position of the left hand window opening. Begin by test fitting the stringer and trimming as necessary. It is desirable to trim so that the stringer is not resting on a weld bead (Photo 065). Once you're happy with the fit, apply adhesive to the top and side edge of left hand window frame.

**Photo 066****Photo 067**

Place the stringer into position and use masking tape and spring clamps to secure the stringer while the adhesive cures. Use plastic strips to protect the stringer from being damaged by the spring clamps.



**Photo 068**



**Photo 069**

**LOG & INSPECTION SHEET FUSELAGE # 3**

**Log sheet**

	FABRICATION AND ASSEMBLY TASKS	A	B	C	D
		Mfr Kit/Part/ Component	Commercial Assistance	Am-Builder Assembly	Am-Builder Fabrication
	Wings - 24 Listed Tasks				
	Task #				
F2	Fabricate Composite Cores or Shells, Skins				X
F3	Fabricate Bulkheads or Crossmembers	X.5			X.5
F9	Fabricate Brackets and Fittings	X			
F10	Assemble Brackets and Fittings			X	

**Inspection point**

	INSPECTION ITEMS	BUILDER	ALTERNATE
1.6	Top center stringer: forward end that is over rear baggage compartment should be painted flat black. Ensure stringer is secure and straight.		
1.7	Left upper front stringer: ensure installed and secure correctly.		
1.8	Left lower front stringer: ensure straight and secure at all attach points.		
1.9	Left upper side stringer: ensure straight and secure at all attach points.		
1.10	Left lower side stringer: ensure straight and secure at all attach points.		
1.11	Bottom center stringer: ensure all Phenolic blocks are secure. Aft elevator		
1.12	pulley block installed with hardware per drawing. Ensure stringer is straight and secure.		
1.13	Right side top stringer: ensure straight and secure at all attach points.		
1.14	Right side middle stringer: ensure straight and secure at all attach points.		
	Right side bottom stringer: ensure straight and secure at all attach points.		

**SECTION 11 BAGGAGE SIDE PANELS****IF YOU PURCHASED EXTENDED BAGGAGE, MOVE PAST THIS SECTION.**

Apply Methacrylate adhesive to the top, aft and bottom edge of the baggage side panels. Use masking tape to hold the panels in place on the top longeron of the fuselage. Ensure that the forward edge of each side panel is flush with the window frame.

Apply masking tape to the inside of the aft cargo compartment to secure side panel.

**Photo 070****Photo 071****Photo 072****Photo 073**

Apply Methacrylate to the leading edge of the side panel and clamp into place on the frame. Ensure that the edge is flush with the window frame. Apply a bead of Methacrylate to the bottom seam between the fiberglass baggage tray and the side panel.

**Photo 074****Photo 075**

Apply a bead of Methacrylate to the side diagonal fuselage tube and the side panel. Smooth the bead to ensure a good bond. Repeat for the opposite side.



*Photo 076*



*Photo 077*

## SECTION 12 FLOORBOARD

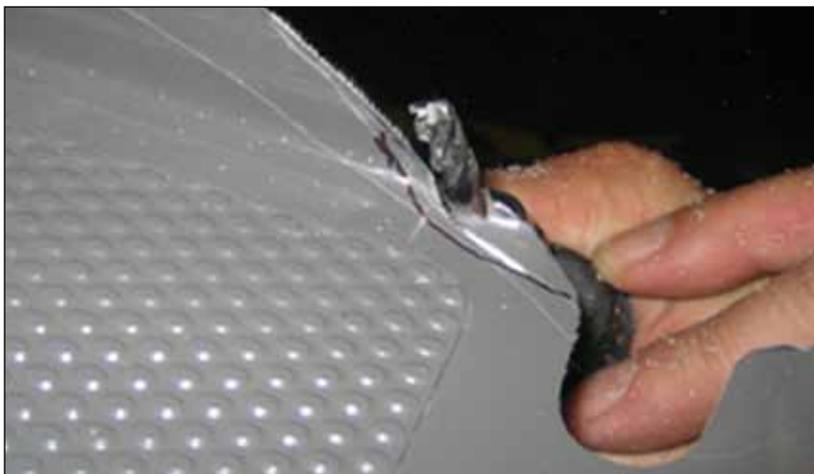
The assembly of the floorboard is a fairly lengthy step. The floorboard will have the control stick, rudder and brake pedals and several electrical components installed.



**Photo 078**

### SECTION 12 STEP 1. FITTING

Begin by placing the floorboard into the fuselage for a test fit. Mark any areas that need to be trimmed. These trims will be minimal and should not involve any significant cutting. If you perceive that you need to remove a big chunk it would be best to reevaluate what is wrong. For the minor re-shaping, use a die grinder with an abrasive wheel or rotary file bits. When trimming is complete, place the floorboard again and make sure things are right.



**Photo 079**



**Photo 080**

After the test fitting is satisfactory, remove the floorboard from the fuselage and enlarge all floorboard mounting holes with a #5 drill bit.

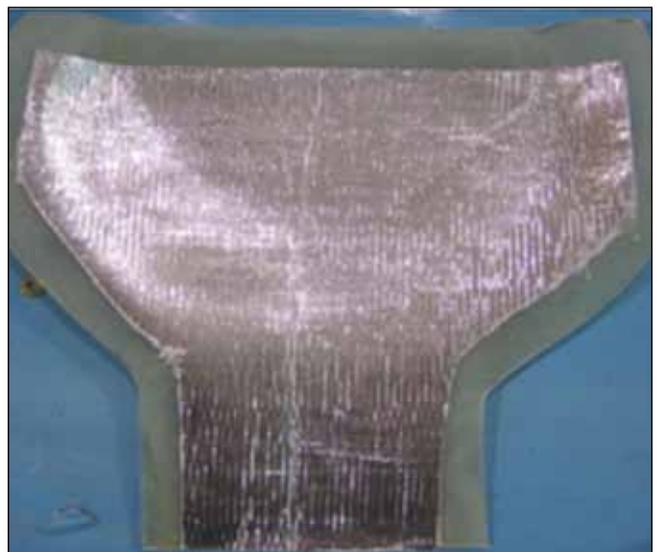
**SECTION 12****STEP 2. HEATER DUCT AND HEAT SHIELD**

Turn the floorboard such that the bottom surface is upwards. Make some soft surface rests for the floorboard that will prevent it from tipping and/or moving around. The “soft” concept is intended to avoid marring the factory finish.

Scuff the surface of the heat duct area of the floorboard (SC91014-001) and the heat shield (SC91017-001) with sandpaper and then wipe both with denatured alcohol. Note the perimeter area in Photo 083 and Photo 084 where the Methacrylate will be applied. You do not want aluminum heat shield in this area.

Now take some of the aluminized heat barrier (~~RM5301-001~~) and trim it to fit and cover the heat duct area (floorboard side and shield side). Once the pieces are cut and fit nicely, apply them to both surfaces. The heat shield material should be fairly smooth with as few bubbles as practical.

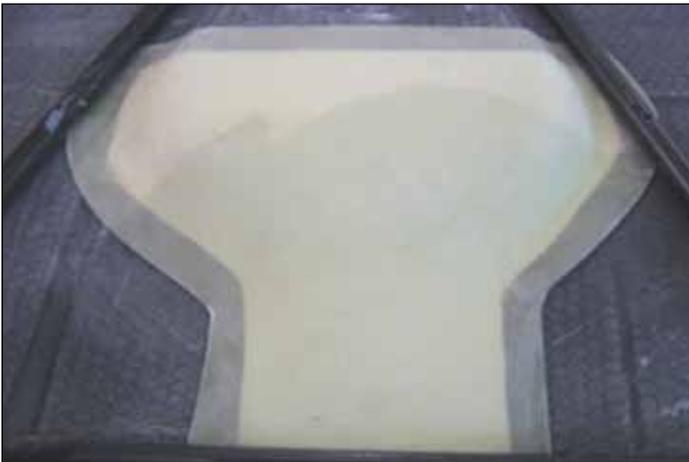
RM5301-002

*Photo 081**Photo 082**Photo 083**Photo 084*

**Photo 085**

Test fit the cabin heat shield bottom to ensure proper fit. Mark and trim if needed. Apply a bead of Methacrylate to the area around the cabin heat duct and press the cabin heat shield into place. If the shield is not “stuck down” by itself, it may be useful to have a couple of weights to hold the shield in place while the Methacrylate cures.

This is a good time to take a break while the Methacrylate in the previous step cures. Once the Methacrylate holding the heat shield is firmly set you can install three grommets located on the front of the seat base and two located by the battery holder in the seat base. Photo 087 and Figure FS14 details these locations.

**Photo 086****Photo 087**

**SECTION 12**

**STEP 3. SEAT BASE**

The next steps are completed with the seat base bottom side down,

The aluminum seat reinforcement rails need to be installed next. The rails on the outside are intended to match those on the inside of the seat base. Mate the inside reinforcements with the outside reinforcements (two sets) and secure each set with Clecocs.

Install the fasteners per Figure FS13 and Figure FS14.

**NOTE: Figure FS13 SHOWS SOLENOID LOCATIONS.**



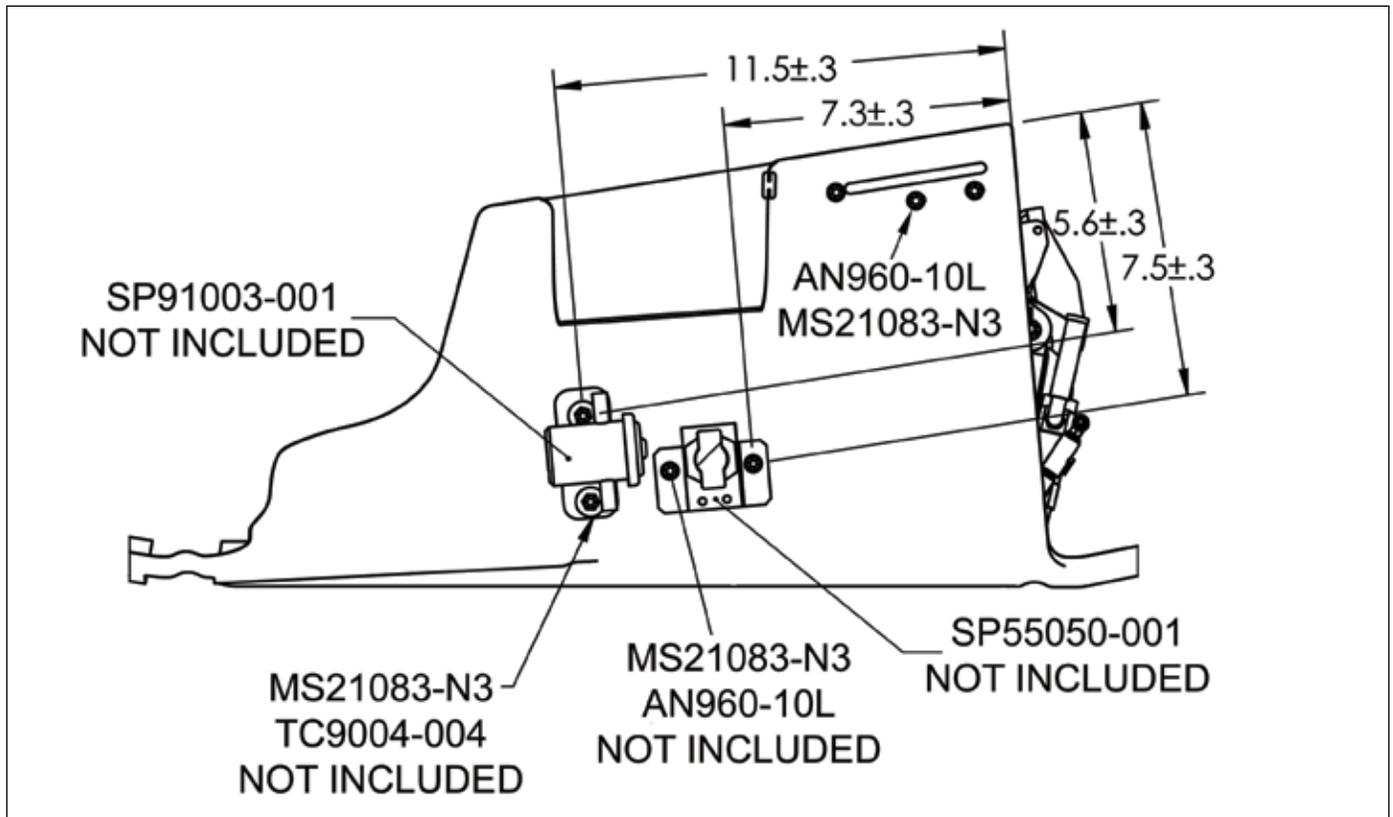
**Photo 088**



**Photo 089**



**Photo 090**



**Figure FS13**

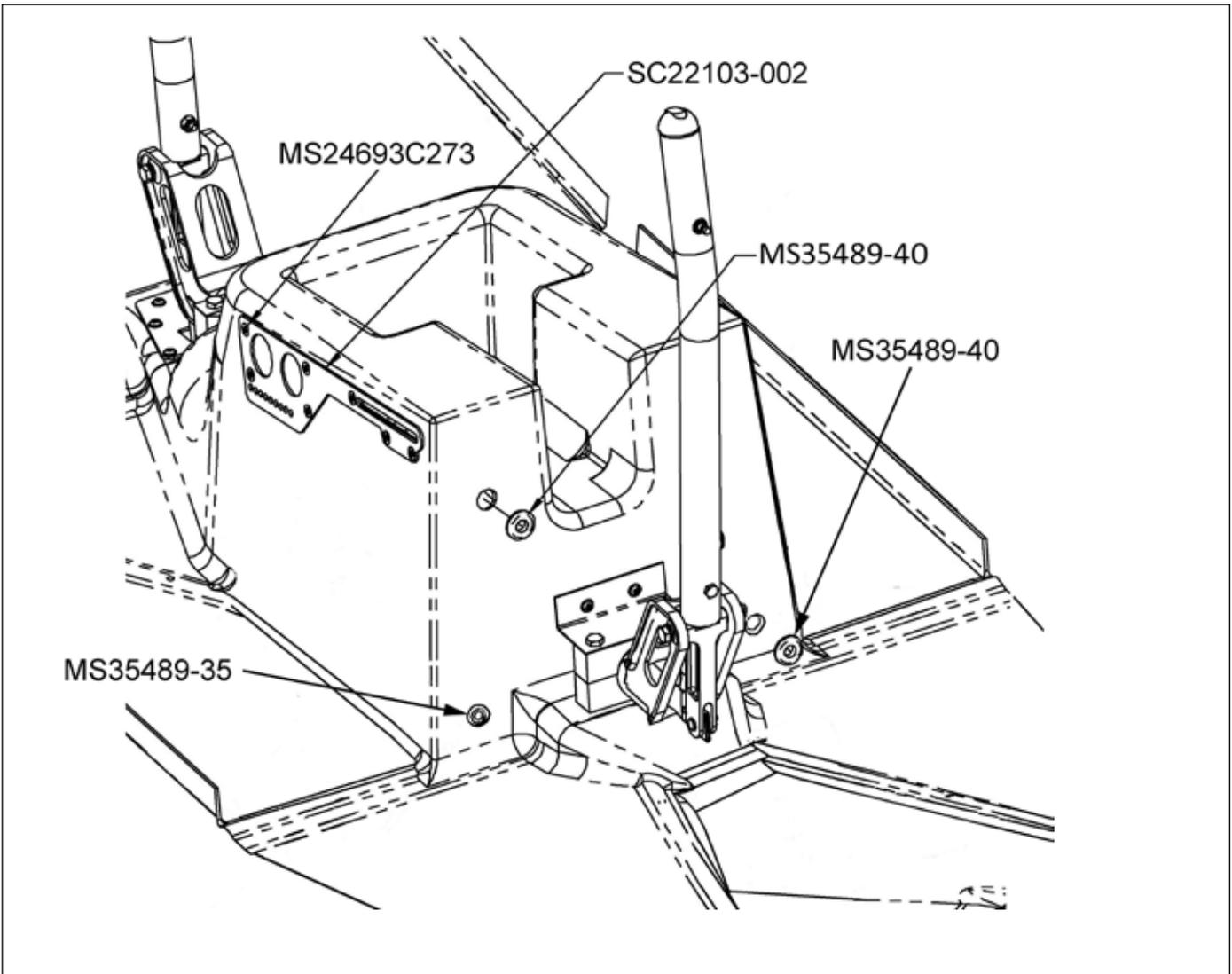


**Photo 091**



**Photo 092**

Next lightly file the slot to achieve a smooth opening for the seat slider. Your goal is to ensure that an AN4 bolt can slide freely from end to end in the slot. Make sure that the seat adjustment holes are clean by drilling them with a #10 drill bit.



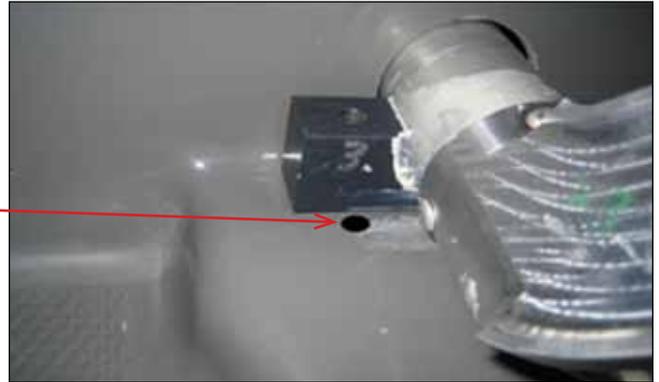
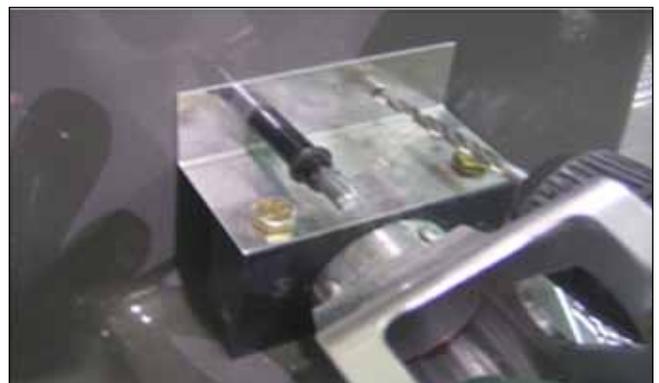
**Figure FS14**

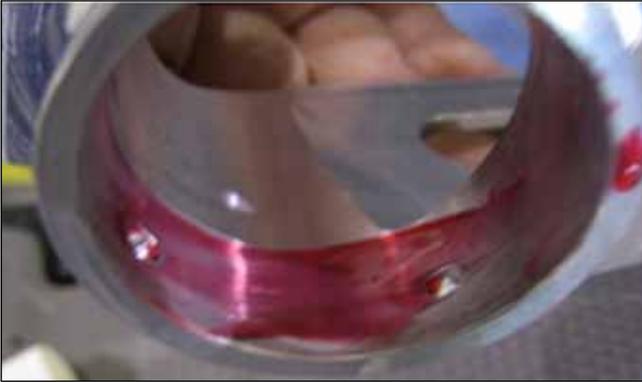
**SECTION 12/ STEP 4. TORQUE TUBE**

The next steps are focused on mounting the control stick. Start by enlarging the pilot hole at the front of the seat base for the front torque tube bushing. The pilot hole was pre-drilled during the trimming sequence at the factory but needs to be enlarged. Use a 1/4" bit to drill out the holes. Next lubricate the half round cutout in the torque tube block (SC91002-001) with a little of the white lithium grease. Ensure that there is a 1/8" gap around the torque tube. If necessary, sand the hole until the 1/8" clearance is achieved.

Next place the top torque tube bushing in place. Set the torque tube stiffener on top of the bushing and insert a bolt. Ensure that the torque tube is centered in the hole in the seat base and that the stiffener is flush against the face of the seat base. Drill the second 1/4" hole in the bushing and insert the second bolt. Then drill one #10 hole in the seat base using the stiffener as a template. Install a Cleco in that hole and drill the second hole. Be certain to keep the rear of the torque tube centered in the seat base opening (that you assured had 1/8 inch clearance) while performing this step. Use Figure FS16 and Figure FS17 to identify the fasteners. Using the screws called for in Figure FS16 fasten the stiffener to the face of seat base. Use 40 inch-pounds of torque on these screws. Then place the bottom torque tube stiffener in place and secure with hardware (per Figure FS16 and Figure FS17). Use 90 inch-pounds of torque on these bolts. Make certain that the bottom stiffener is oriented with the hole facing forward.

**THE REAR TORQUE TUBE MOUNTING BLOCK WILL BE DRILLED AND BOLTED DOWN ON Photo 121 in SECTION 13 .**

**Photo 093****Photo 094****Photo 095****Photo 096****Photo 097**



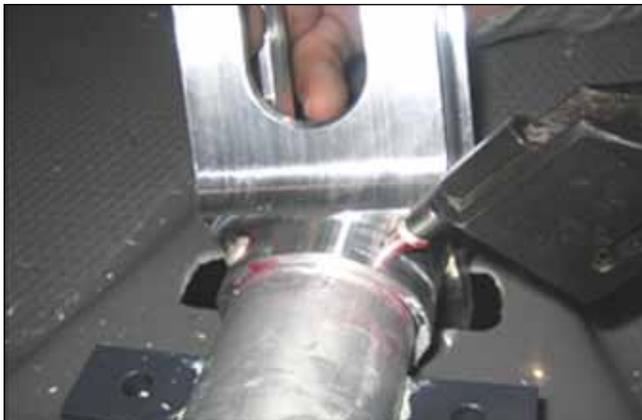
**Photo 098**

Now it is time to test fit the rear mast on the torque tube. Be sure to have the lower rear pivot block in place. Once you are happy with the fit, apply a thin coat of red Loctite to the rear control stick mast and slide the rear mast onto the torque tube. Rotate things back and forth until you end up with the two top holes aligned. Place 2 Clecos into the top two holes.



**Photo 099**

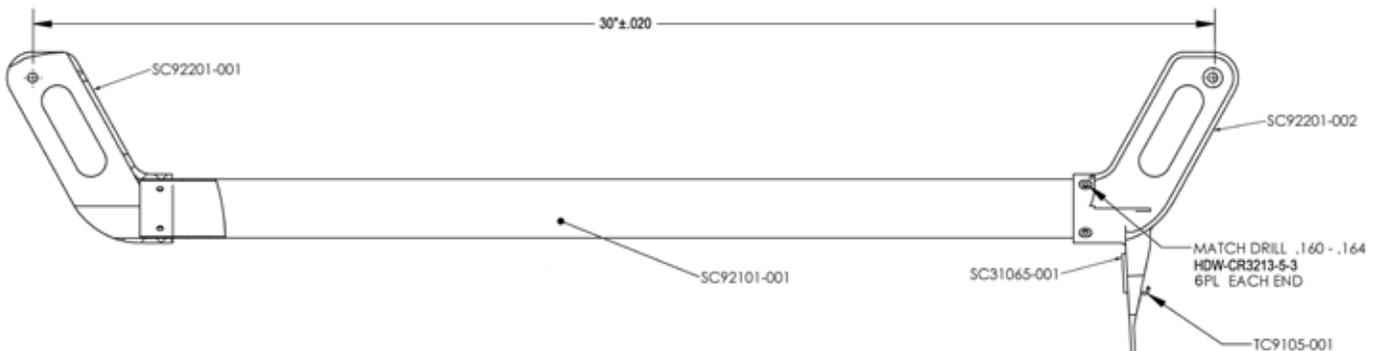
Rotate the control stick to the full left position to allow access for a rivet puller. Insert a rivet into one of the exposed bottom holes. Use rivet puller to set the rivet. Ensure rivet is properly seated in the hole with the head flush to the surface.



**Photo 100**

Set the other bottom rivet. Then place the rivets in the remaining holes. Use Figure FS15 to guide your work.

**YOU WON'T BOLT THE REAR TORQUE TUBE BLOCKS TO THE FLOORBOARD UNTIL THE FLOORBOARD IS MOUNTED IN THE FUSELAGE.**



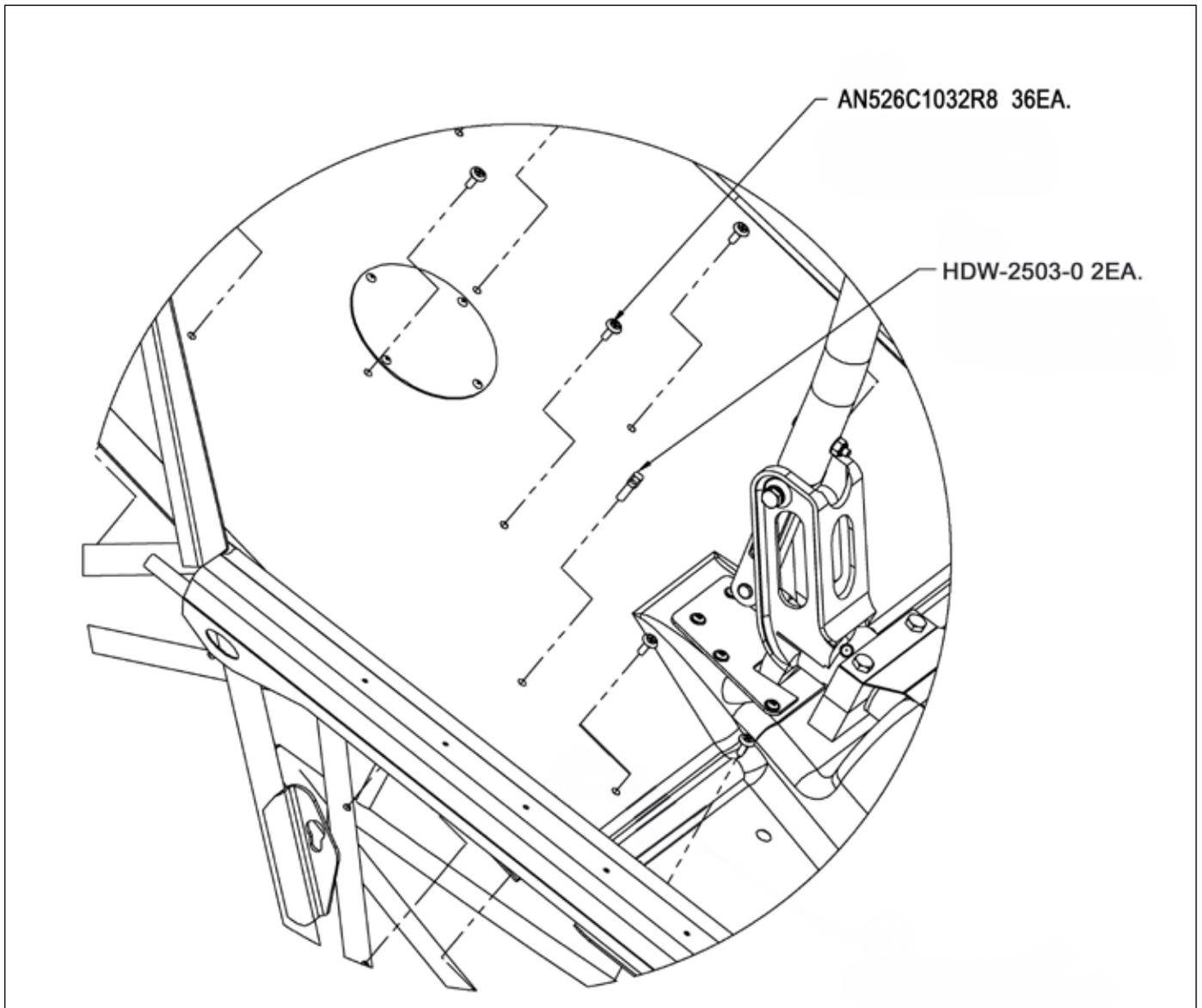
**Figure FS15**

**SECTION 12**  
**STEP 5. COVER PLATE**

Install the Cover Plate (PN SC91007-001) consistent with the Photo 101 and Figure FS16 using HDW-S4R.25TA Sheet Metal Screws.



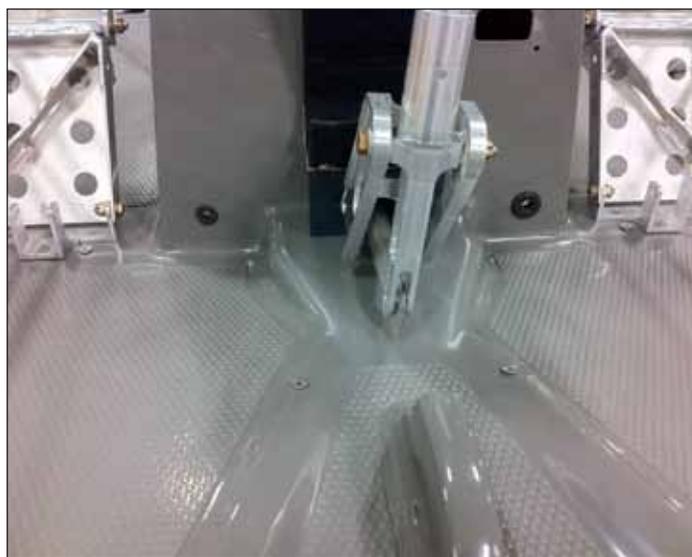
**Photo 101**



**Figure FS16**

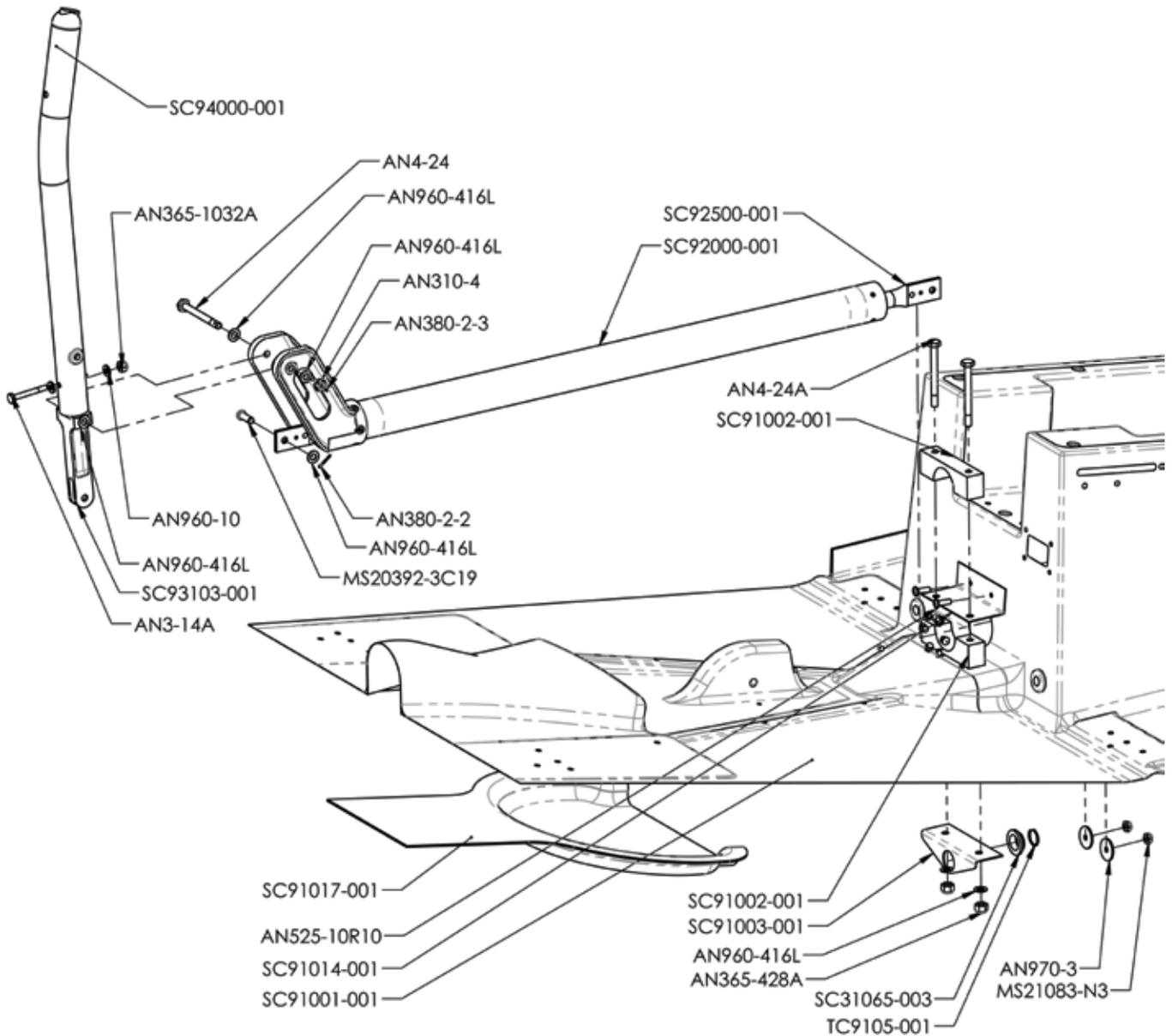
**SECTION 12****STEP 6. CONTROL STICK STUBS**

Now is the time to install the control stick stubs and control link assembly. Slide the control link assembly into the torque tube. Use Figure FS17, Figure FS18, Figure FS19, and Figure FS20 for hardware callout. Be sure to install the thin washers AN960-416L between the torque tube mast and stick stub. It will help to use some lithium grease on the washers and control stick mast. You will need to grease the pivot holes in the mast and stick stub. Do not grease the lower pivot at this time. The lower pivot will get greased when the control cables are installed. Tighten the nut on the bolt that goes through the mast and stub so that is no side movement but the stick pivots freely. If the cotter pin holes don't line up tighten the nut until the holes line up, then insert the cotter pin. Temporarily install the stub to link pins MS20392-3C19, these pins will be removed again when the control cables get installed.

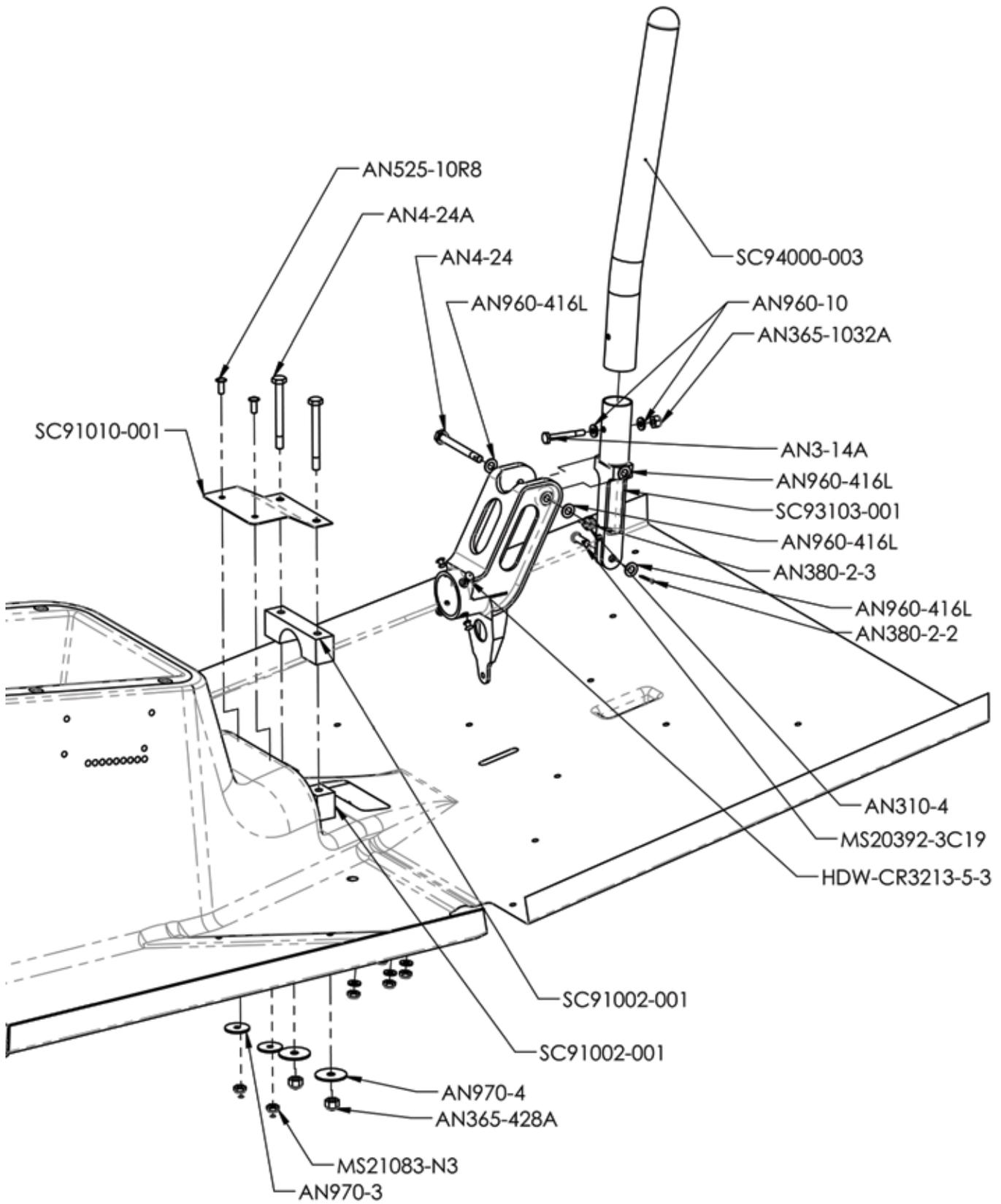
**Photo 102****Photo 103****Photo 104****Photo 105**

**SECTION 12**  
**STEP 7. RUDDER/BRAKE PEDAL INSTALL**

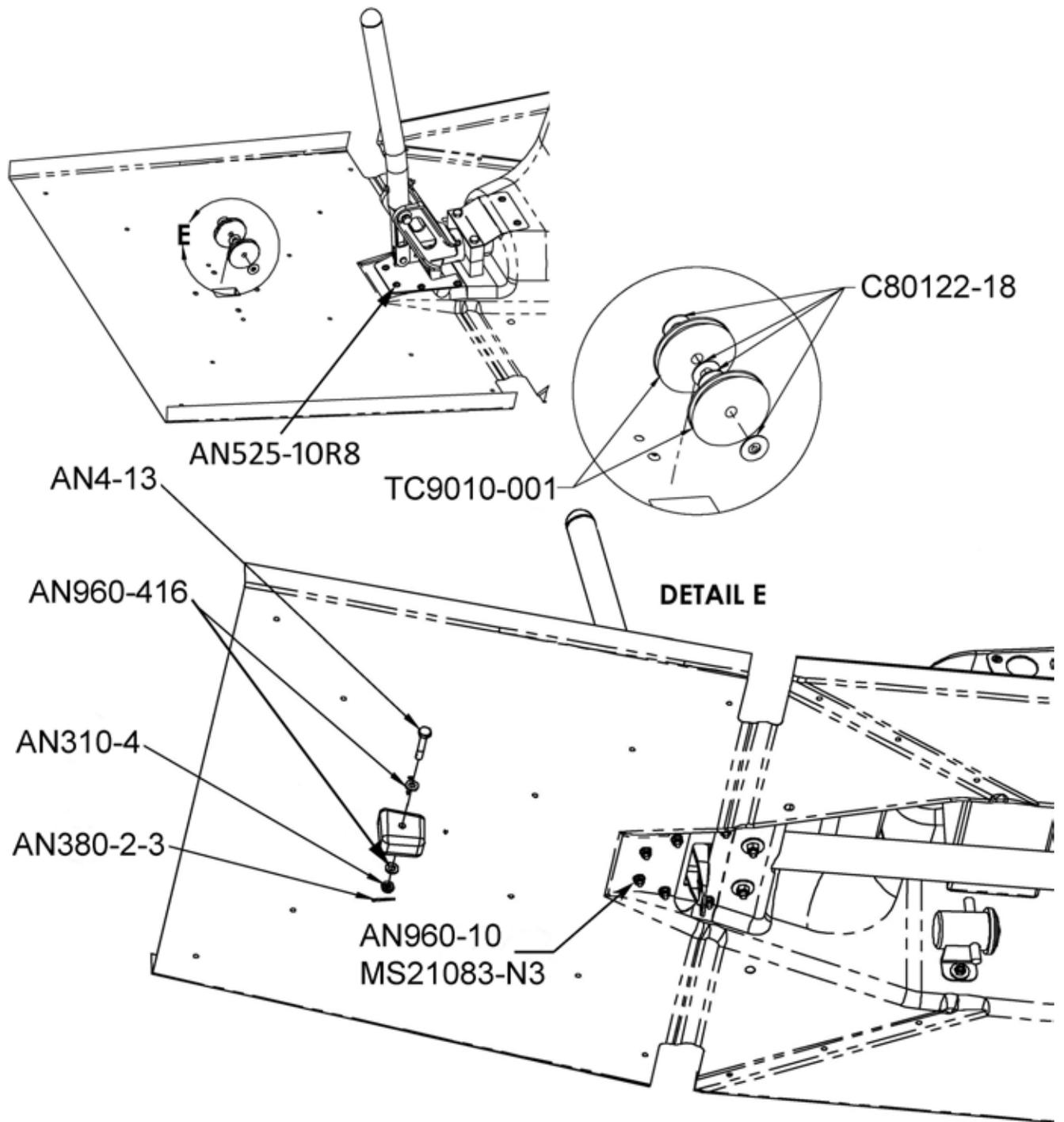
Such that you can understand the plan, Figure FS17, Figure FS18, Figure FS19 and Figure FS20. Figure FS17 and Figure FS18 depicts the components of the floorboard without showing the pedals.



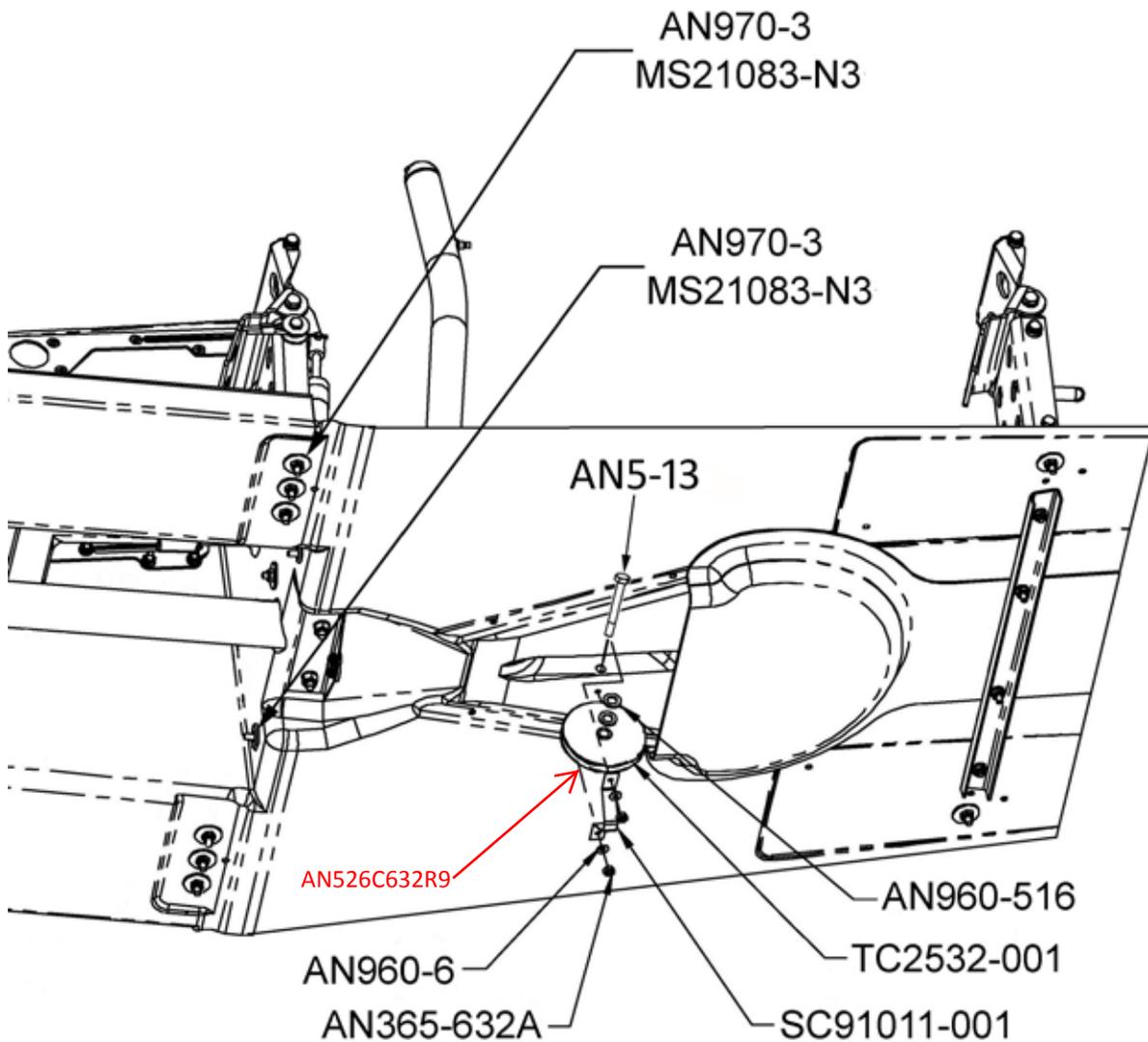
**Figure FS17**



**Figure FS18**

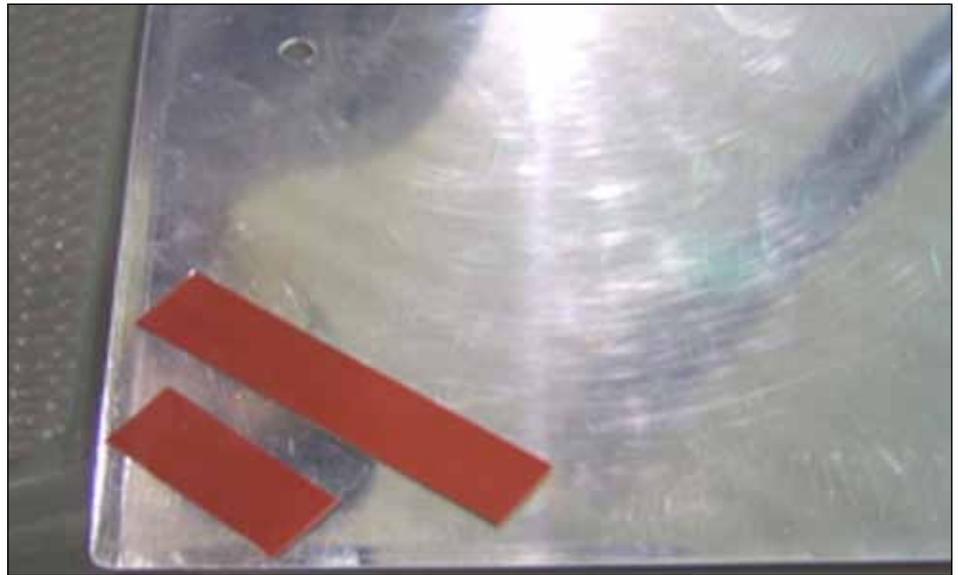


**Figure FS19**



**Figure FS20**

Apply two pieces of double stick tape to the rear outboard corner of the heel plates (SC91005-001) as shown in Photo 106. Flip the plates over and stick them to the floorboard using Clecos to secure the plates. Trim the heel plate edge after installation so that the floorboard edge and the heel plate edge match. The screws to hold these plates in place come when the floorboard is fastened into the fuselage.

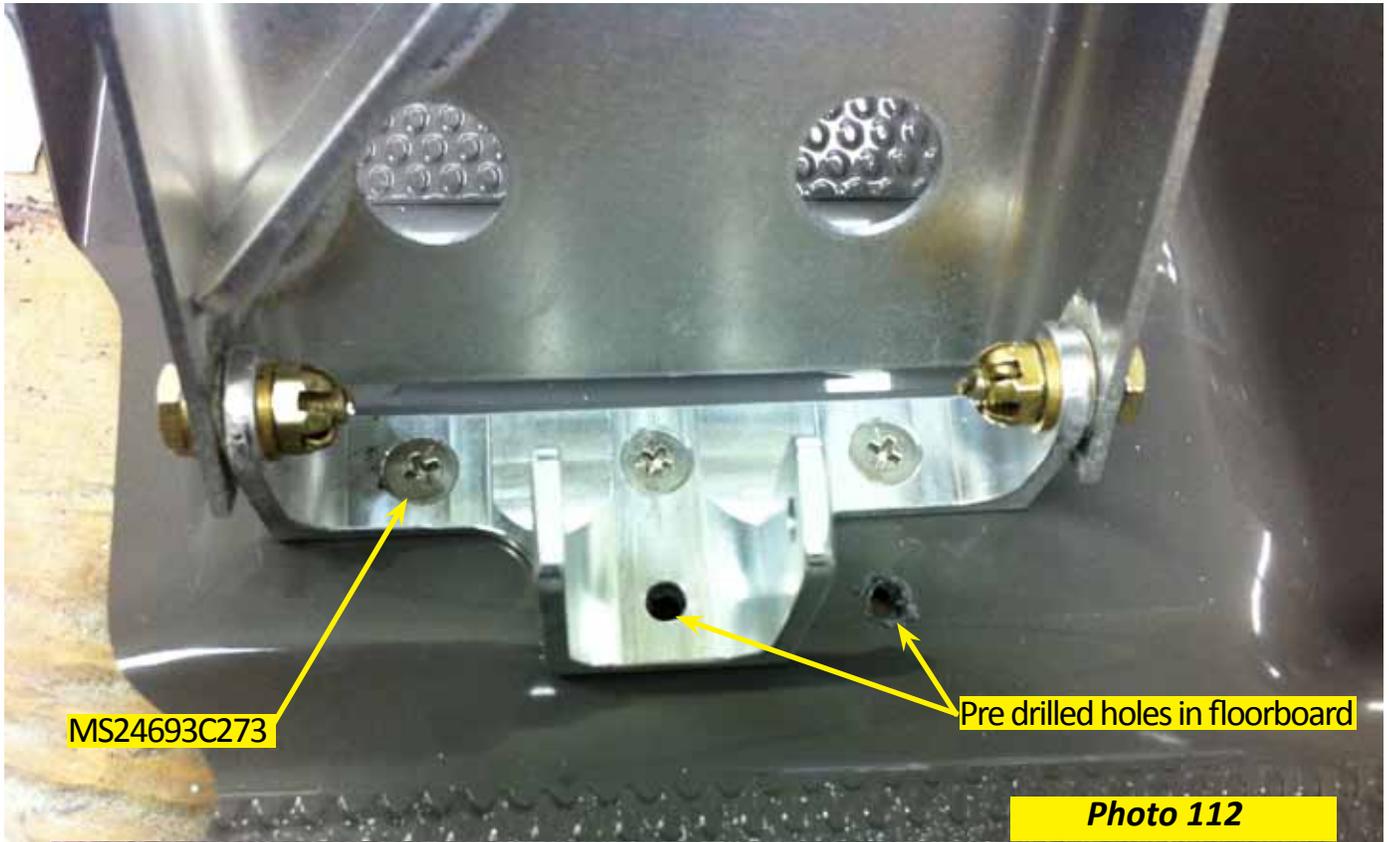
**Photo 106****Photo 107**

**Photo 108****Photo 109****Photo 110****Photo 111**

The rudder pedals have a back brace that crosses the pedal diagonally. When installing the pedals these diagonals go up and towards the middle of the fuselage. As such, the diagonals (left and right; use Figure FS20 for part call out) will make a chevron when viewed from the front of the floorboard looking back. Position the left and right front pedals and hold them in place using Clecos. Install the rudder pedal stiffener (SC96008-001) on the underside of the floorboard under the front pedals. So far, you're just using Clecos to hold everything in place.

Next, use Clecos to fasten the left and right rear rudder pedals in place. Swing the master cylinders out of the way. Ensure that the base of each pedal is parallel with the base of the front pedal.

**REAR RUDDER PEDAL CLARIFICATION** There has been some confusion in the past about the location of the rear pedal with respect to the location on the floorboard. The next two pages will address this.



In Photo 114 you will see the floorboard mounted to the fuselage. The rear rudder pedal is mounted in such a way that the three screws in the rear of the rear rudder pedal mounting bracket will need to be match drilled to the floorboard using the center forward pedal mounting bracket screw hole to locate the rudder pedal Photo 112. Attach the rear rudder pedal using the hardware shown in Photo 112 and Photo 113.

**Photo 114**

**LOG & INSPECTION SHEET FUSELAGE # 4**

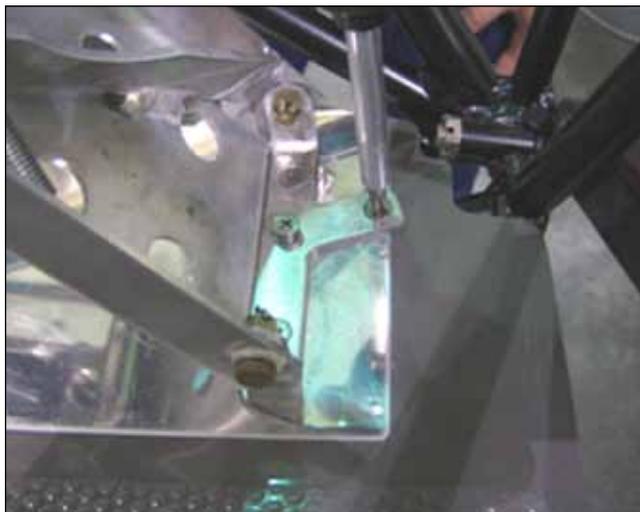
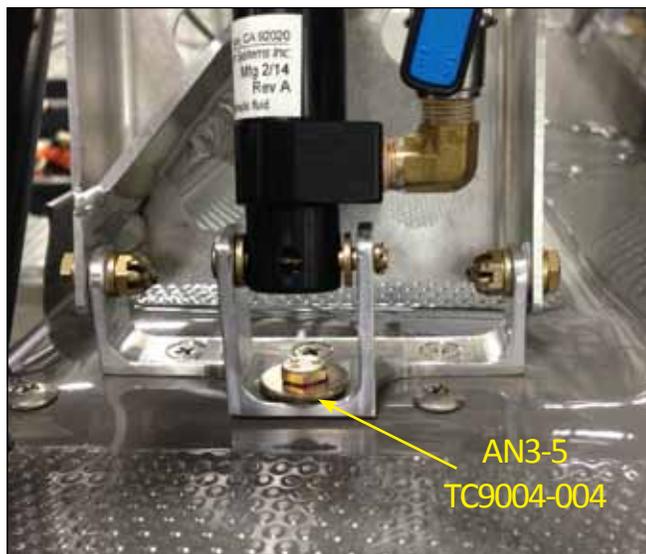
**Inspection point**

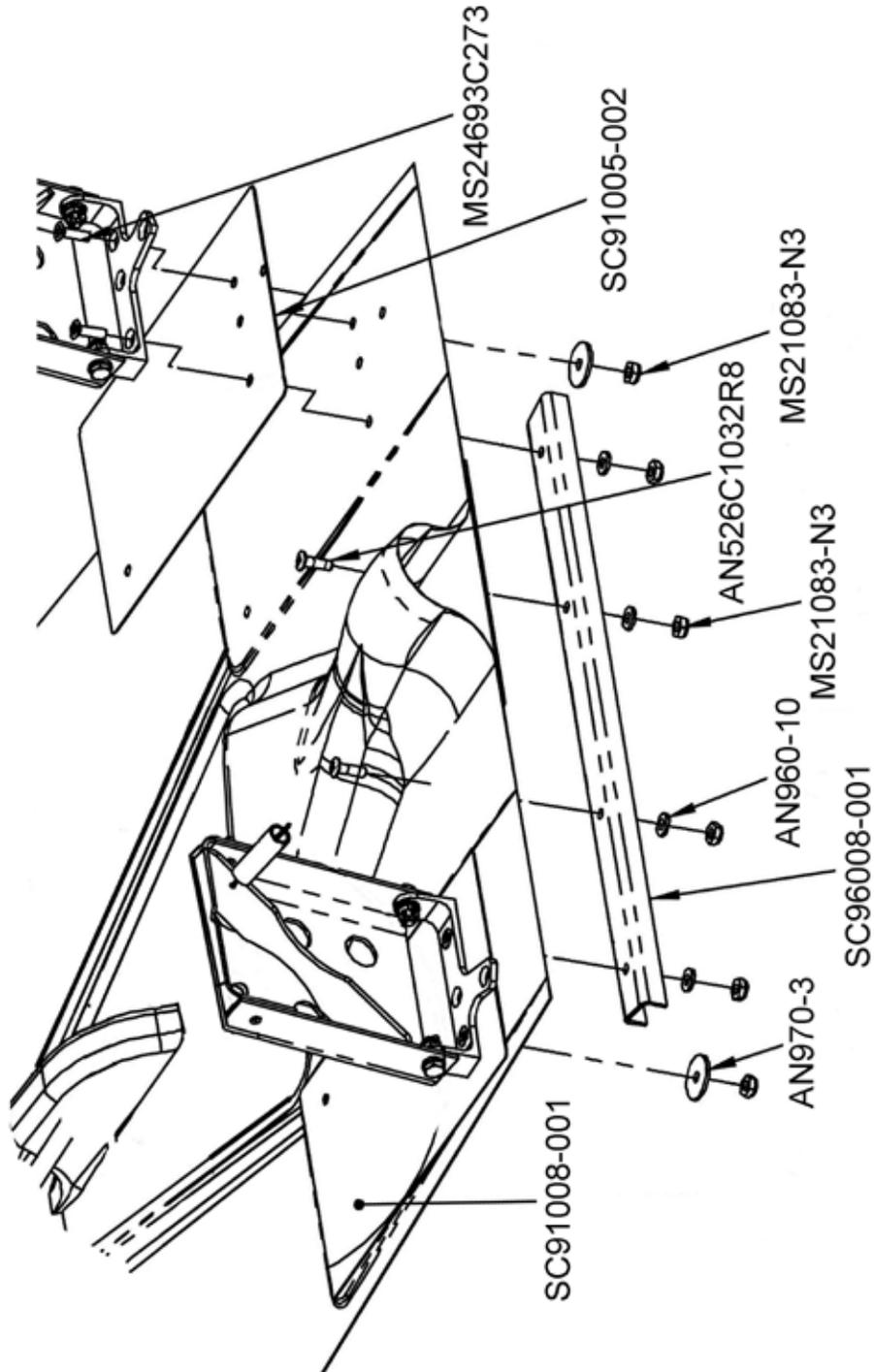
	INSPECTION ITEMS	BUILDER	ALTERNATE
1.15	Floorboard edges are smooth around tubes and brackets.		
1.16	Ensure torque tube rivets are properly installed.		
1.16	Rudder pedals installed with correct hardware per figures.		
1.16 1.16	Rudder pedal reinforcement bar installed.		
1.16	Double stick tape applied under rear outside corners of heel plates.		
1.16	Ensure seat base reinforcements have been drilled out and cleaned. Seat slider will move smoothly through slot.		
1.16	Master cylinder length, center of hole in base to center of hole in shaft must be 5.125".		
1.16	Master cylinder properly installed and zipped tied.		
1.16	Aileron stop plate installed with center of torque tube movement.		
1.16	Aileron cable cutouts should be even with the center of the 1st floorboard screw hole.		
1.16	Ensure master solenoid and starter solenoid mounted and secured.		
1.16	Ensure control stick mast bolt nuts have been cotter pinned.		
1.16	Ensure front support blocks and stiffener are properly aligned with seat base. Torque tube moves freely and is centered. Front support block bolts have been torqued and marked. (Rear bolts torqued after floorboard installed in fuselage.)		
1.16	Ensure insulation was installed on top and bottom of cabin heat duct. Cabin heat duct is securely mounted in place.		
1.16	Ensure forward elevator cable cutout will allow nico press to clear fiberglass edge.		

**SECTION 13 ATTACH FLOORBOARD TO FUSELAGE**

At this point you should have a pretty snappy looking floorboard that is fully populated with hardware. Review the steps to get to this point (for the floorboard) in your mind. If everything looks like its in order, lift the floorboard and place it in the fuselage. Be careful in the placement to not scratch paint or to give anything an undesired bash.

It's time to fasten the floorboard. You will be placing 20 screws on each side for a total of 40 screws. All of these screws go into threaded holes in the fuselage tubes. For each side (left and right) there are 2 screws in the front pedals (these are flathead), 1 screw in the middle of the rear pedals (AN screw), 2 screws on each side of the rear pedals, 1 screw in the back corner of the heel plate, 2 screws along the diagonal from the front stick to the front pedal and 12 screws in the rear section. Place all the screws into the floorboard just enough to engage the threads. Leave the screws partially threaded to allow the floorboard to move around a bit. It may be necessary to push or pull the floorboard a tiny bit to get screws to line up and start. You can use an awl for this. Don't wallow out the holes any more than is absolutely necessary. You need to apply a small drop of blue Loctite #242 before final installation. Once all 40 screws are started, tighten them all to a torque of 20-25 inch-pounds. Apply Torque Seal to all of the pedal base screw heads.

**Photo 115****Photo 116****Photo 117****Photo 118**



**Figure FS21**

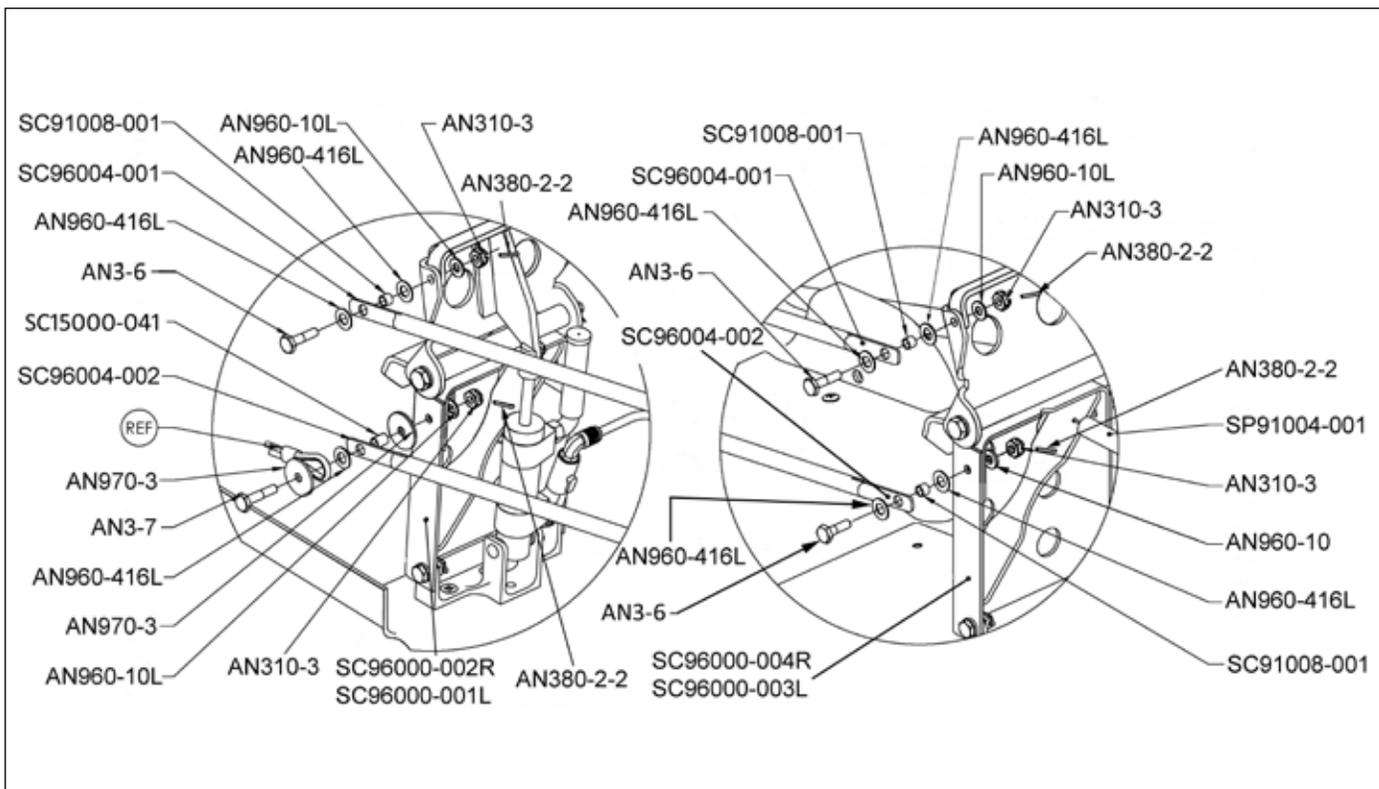


**Photo 119**



**Photo 120**

Now that everything is square and parallel, match drill the holes in the front pedal base through the floorboard using a #8 bit. Then drill the two remaining holes in each rear pedal base using a #12 bit. Then match drill the remaining holes in the stiffener (under the front pedals) through the floorboard. Install all of the fasteners in the front and back - left and right pedal bases and the stiffener in accordance with Figure FS21. You will now be able to install the rest of the rudder pedal parts and hardware per Figure FS22.



**Figure FS22**

**Photo 121**

Once the floorboards are installed it is necessary to fit the rear torque tube bearing blocks. Be sure to have the rear pivot block pushed all the way back against the rear torque tube mast (**MAKE SURE THE FRONT TORQUE TUBE MAST IS PUSHED BACK AGAINST THE BEARING BLOCKS**). Center the torque tube in the seat base and take care to have 1/8" clearance around the torque tube. Once you are happy with the fit, Use a 1/4" bit to drill out the holes. Next lubricate the half round cutout in the torque tube block (SC91002-001) with a little of the white lithium grease. Next place the top torque tube bushing in place. Set the torque tube stiffener on top of the bushing and insert the bolts. Then drill the #10 holes in the seat base using the stiffener as a template. Use Figure FS17 to identify the fasteners. Use 40 inch-pounds of torque on these screws and 90 inchpounds of torque on these bolts. **THE AILERON STOP IS SHOWN IN Photo 121 AND Photo 122. THIS STOP PLATE WILL BE INSTALLED IN THE NEXT STEP.**

**Photo 122**

Now that you have finalized the rear torque tube bearing blocks and torque tube stiffener plate, it is time to install the aileron stop plate. First you will verify that the fuselage is level per Photo 123. Next make sure the torque tube mast is vertical using a digital shown in Photo 124. Place the aileron stop plate on the floorboard as shown in Photo 125. Measure from the aileron cable attachment fitting machined on the bottom of the rear torque tube mast to the aileron stop plate on each side shown in Photo 126 and Photo 127. Once the aileron stop plate is centered, tape into place to keep it from moving (Photo 129 and Photo 130). Recheck the torque tube mast for vertical (Photo 128), and match drill it to the floorboard per Photo 131. After the first hole is drilled install the screw shown in Photo 132 ,using hardware shown in Figure FS19.



**Photo 123**



**Photo 124**



**Photo 125**



**Photo 126**



**Photo 127**



**Photo 128**



**Photo 129**



**Photo 130**

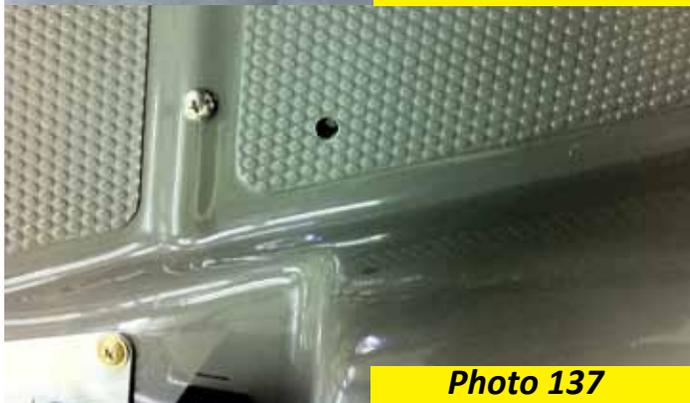


**Photo 131**



**Photo 132**

It's time to match drill the aft section of the front floorboard. Using a marker, mark the rear two seat belt attach holes in the fuselage on the rear of the front floorboard Photo 133. Remove the marked area to reveal the seat belt attach hole. Next using a #10 hole finder, match drill the five #10 screw holes in the fuselage to the front floorboard. Enlarge the #10 holes to a #5 hole. From the bottom of the fuselage Photo Photo 135 use a 1/8" drill bit and drill a pilot hole through the mounting holes for the front seat belt, then from the top enlarge these two holes to a 5/16" hole Photo 137. DO NOT DRILL INTO THE FUSELAGE THREADED HOLES.

**Photo 133****Photo 134****Photo 135****Photo 136****Photo 137****Photo 138**

**Photo 139**

Install the springs (SP91004-001) to each of the front rudder pedals. Then apply a wrap of friction tape as shown in Photo 140. Install a clamp to hold the front rudder pedal spring with hardware in accordance with Figure FS23. Repeat for opposite front rudder pedal.

**Photo 140**

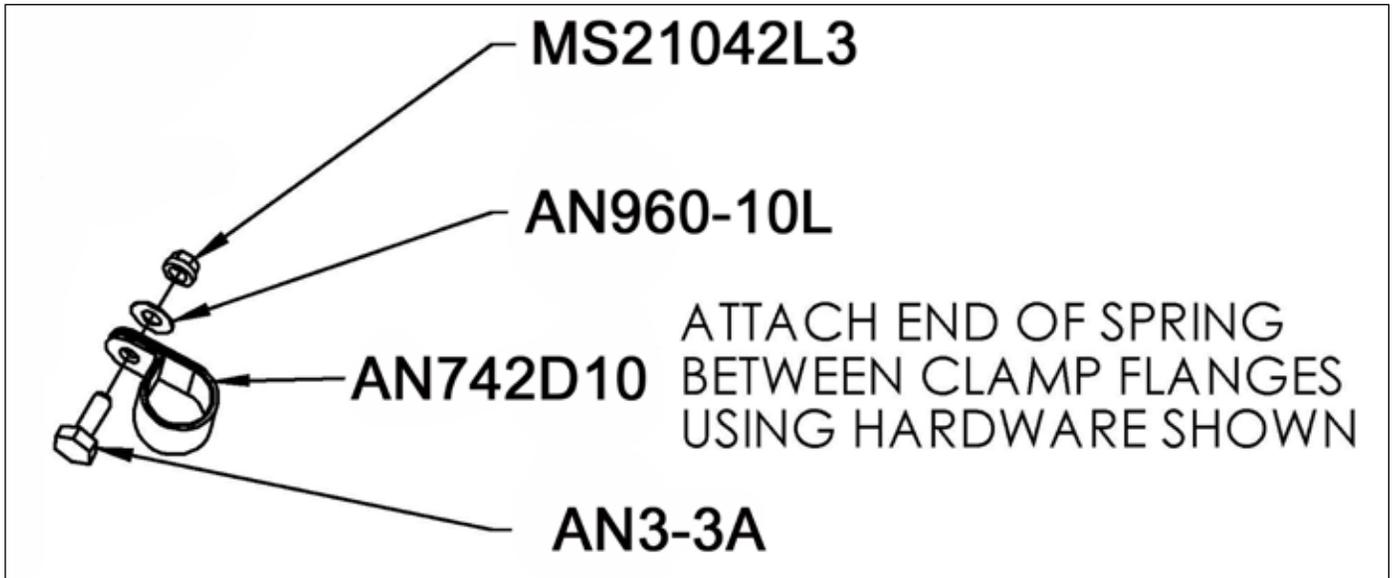


Figure FS23

**LOG & INSPECTION SHEET FUSELAGE # 5**

**Inspection point**

	INSPECTION ITEMS	BUILDER	ALTERNATE
1.23	Floorboard installed with hardware per figures. Screws properly torqued.		
1.24	Brake and rudder linkage installed and secured.		
1.25	Ensure rear torque tube mounting bolts torqued and marked.		
1.26	Ensure aileron stop plate installed with center of torque tube movement.		
1.27	Ensure seat belt holes have been drilled in floorboard.		
<del>1.28</del>	<del>Ensure fuselage aileron pulleys are installed and safetied.</del>		

**IF YOU PURCHASED THE EXTENDED BAGGAGE OPTION, GO TO THE EXTENDED BAGGAGE MANUAL AND INSTALL IT NOW.**

## **SECTION 14 FUEL SYSTEM**

The fuel system is an important system within the Carbon Cub. There can be problems if the system is not installed as prescribed herein. As such, you are greatly encouraged to follow these instructions closely. It is recommended that you:

- 1) Install the lines first (SECTION 14 Step 1)
- 2) Install the protective tubing (SECTION 14 Step 2)
- 3) Apply the fittings (SECTION 14 Step 3)
- 4) Apply the chafe protection (SECTION 14 Step 4)
- 5) Then, fasten the chafe protection to the fuselage and tightening fittings (SECTION 14 Step 5)

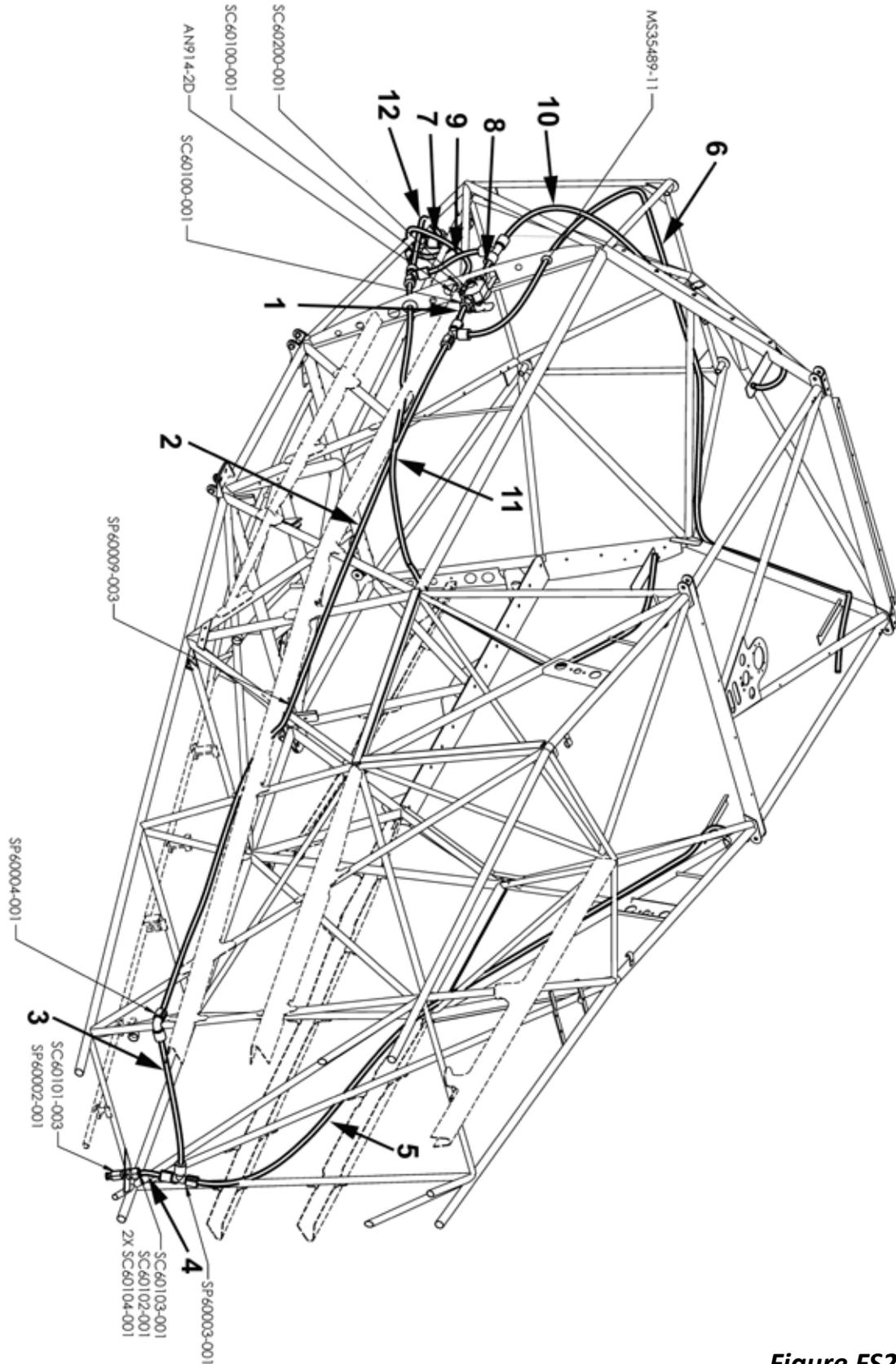
On the next page, Figure FS24 shows the numbering of the fuel lines to match the upcoming text. Fuel lines are identified by 1st, 2nd, etc. There are 11 lines.

### **SECTION 14 STEP 1. INSTALL FUEL LINES**

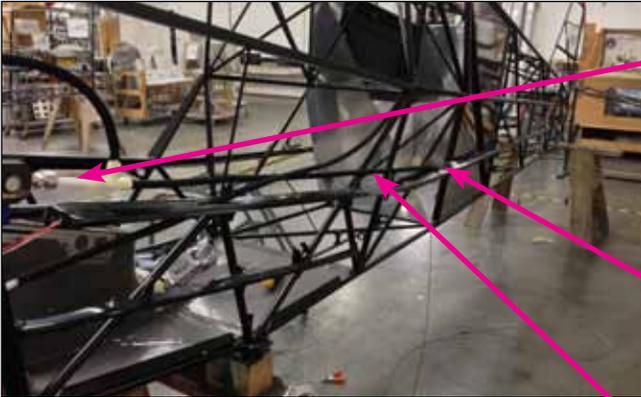
The next steps describe the placement of fuel lines from position to position. This differs from placing lines fitting to fitting. The reason for the difference is the application of the protective tubing at the tube crossings. If you go fitting to fitting you will have to disassemble the fittings to slide the protective tubes in place. Additionally, you should be able to place the fittings at “the sweet spot” of the intersection, as you won’t cut the tubes to final length until all tubes are in place.

As you proceed from line to line in the following steps, temporarily fasten the fuel lines in place with masking tape. It should be sufficient to use a simple tape band. When you get to a fitting position, just overlap the tubes an inch or so and tape them together. A razor tubing cutter (scissors type) is very handy but a razor knife will cut the tubing nicely.

When connecting lines that terminate at the fuel selector you can place the end fitting if you desire.



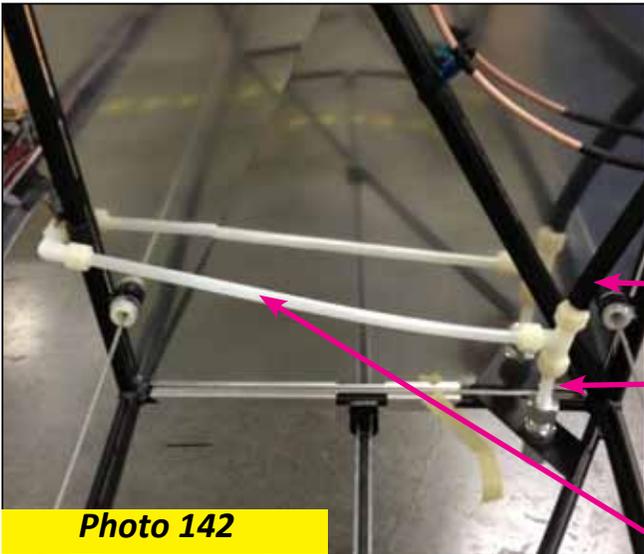
**Figure FS24**



**Photo 141**

Begin the installation by connecting a short piece of fuel line (Line 1) to the rear port on the fuel selector. Extend the line to the position of the T, as shown.

Now fasten the end of the 2nd fuel line to the end of the short line just installed with a piece of tape. The fuel line should pass through the stringer at this point, see Figure FS24 for details. Run the 2nd fuel line to the position of a 90° elbow at the rear of baggage compartment. This line will eventually connect to the fuel low point drain. As such, tape the line in place as you go such that the line “goes a little bit downhill” versus the horizon line when the plane is in a flight-level attitude. This is not a high precision kind of slope, just slightly downward.

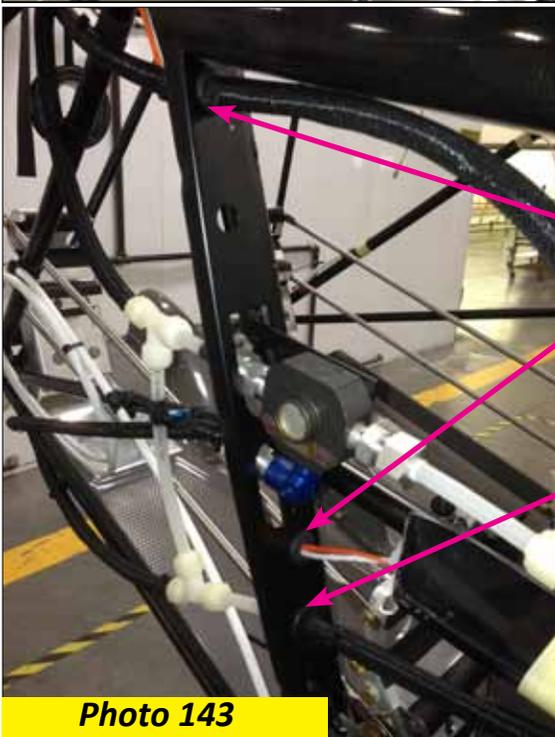


**Photo 142**

Install the 5th line from the position of the right hand fuel tank rear outlet to the rear of baggage compartment.

Install the 4th line from the position of the “T” to the low point outlet.

Install the 3rd line from the position of the 90-degree elbow at the end of the 2nd line to the position of the “T” at the bottom of the 5th line and top of 4th line.



**Photo 143**

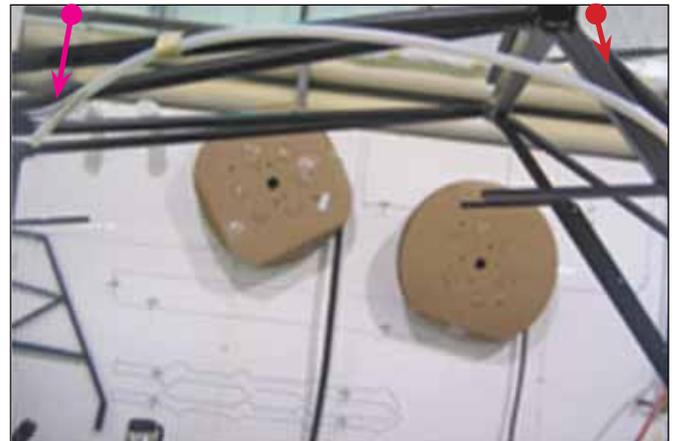
Install the 2 rubber grommets (PN MS35489-11) in the cowl spacer on the left hand side.

Next install the 1 rubber grommet (PN MS35489-12) in the cowl spacer on the left hand side.

The 6th line begins at the position of the right hand fuel tank front outlet, proceeds forward and down the A Pillar, then proceeds across the front of the fuselage. This line terminates at the position of the "T" just aft of the fuel selector.

End of tube

A Pillar



**Photo 144**

This picture was taken later in the fuel line installation but is included here so that you can see the fuel line routing (here with the black anti-chafe material installed) to end at the T.

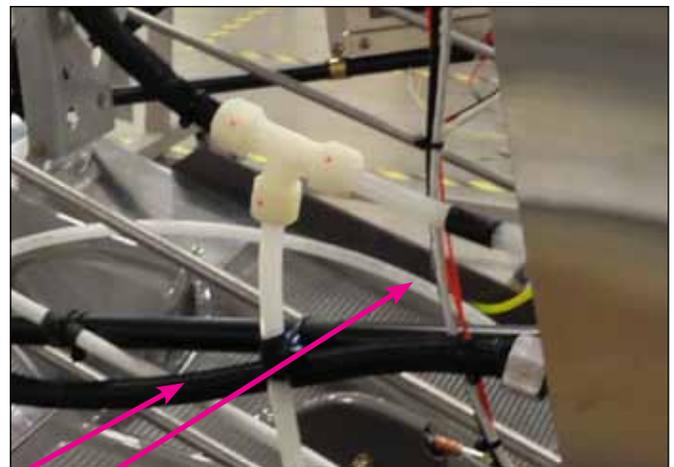
This is the 6th line.



**Photo 145**

At this point the line coming out of the fuel selector should be terminated at every position except the right hand rear fuel tank position. The tank lines (we placed one but there are 4 in total) will each remain un-terminated until the wing is attached to the fuselage. Each of the 4 tank lines should be temporarily closed with a piece of tape or a plastic cap.

Now we'll go back to the fuel selector again.

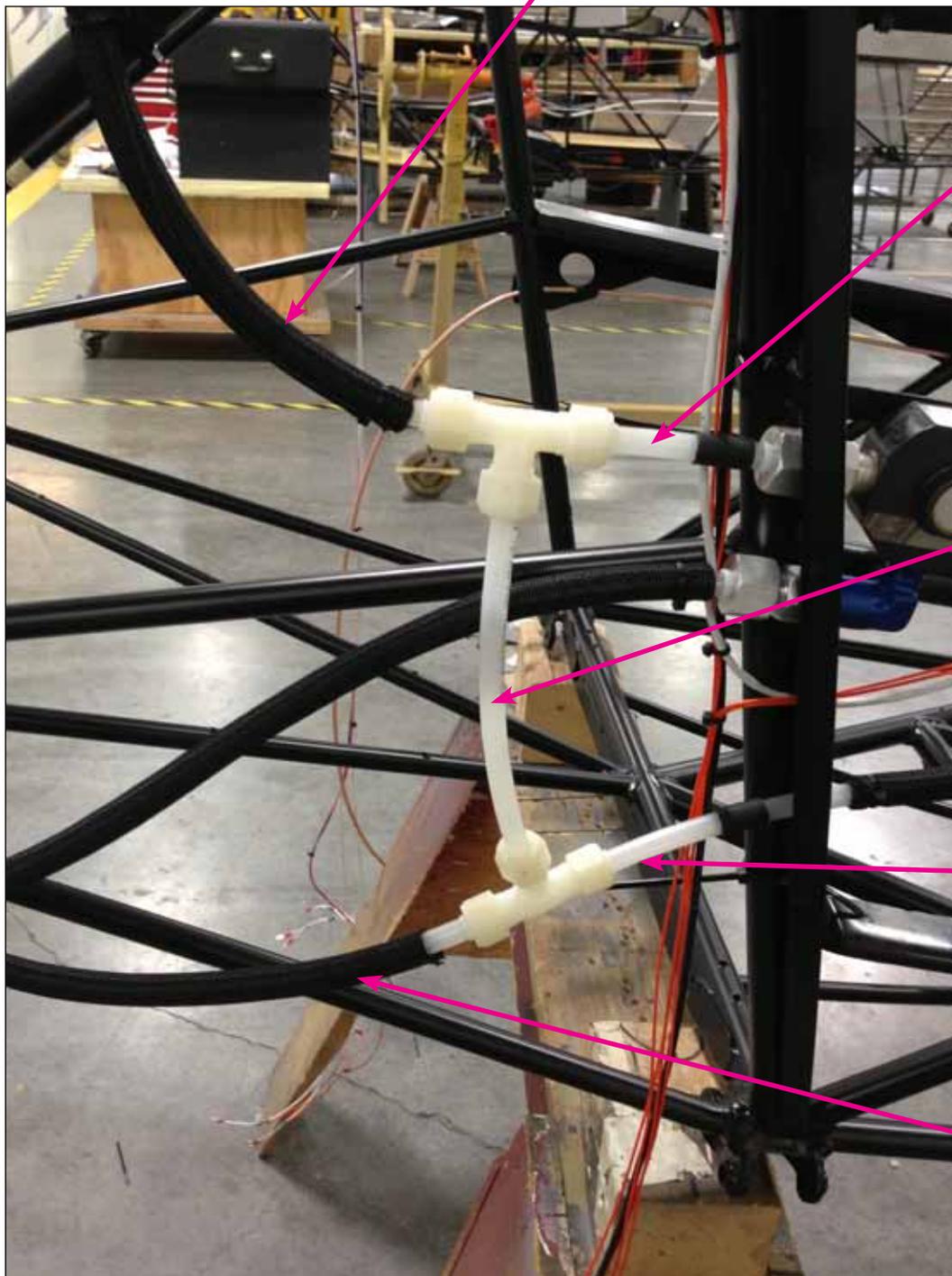


**Photo 146**

The 7th line runs from bottom (outlet) of the fuel selector to the firewall.

Be sure to leave a loop of material available for cutting later.

Next install the 10th line from the position of the front of the "T" forward and then up to the left front tank port.



Insert one end of the 8th line into the forward port of the fuel selector and extend it to the location of the "T" fitting.

Run a piece of tubing (the 9th) from the "T" fitting to the location of the "T" that will connect to the 10th and 11th lines.

install the 11th line from the rear of the "T" back and then up to the left hand rear tank port.

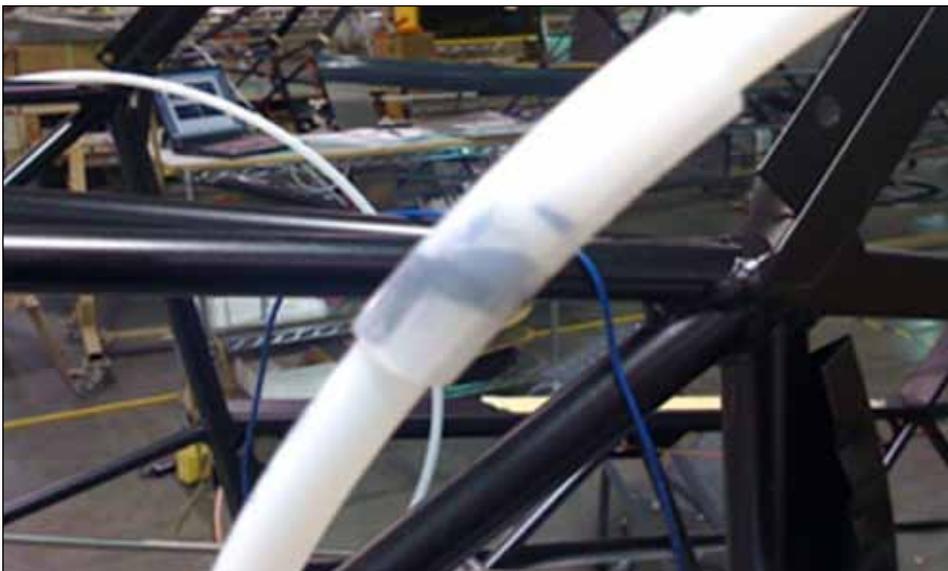
Finally, last but not least, install the 12th line from the front of the "T" to 3" past the motor mount. You will fit this tube to the forward low point drain in a later step.

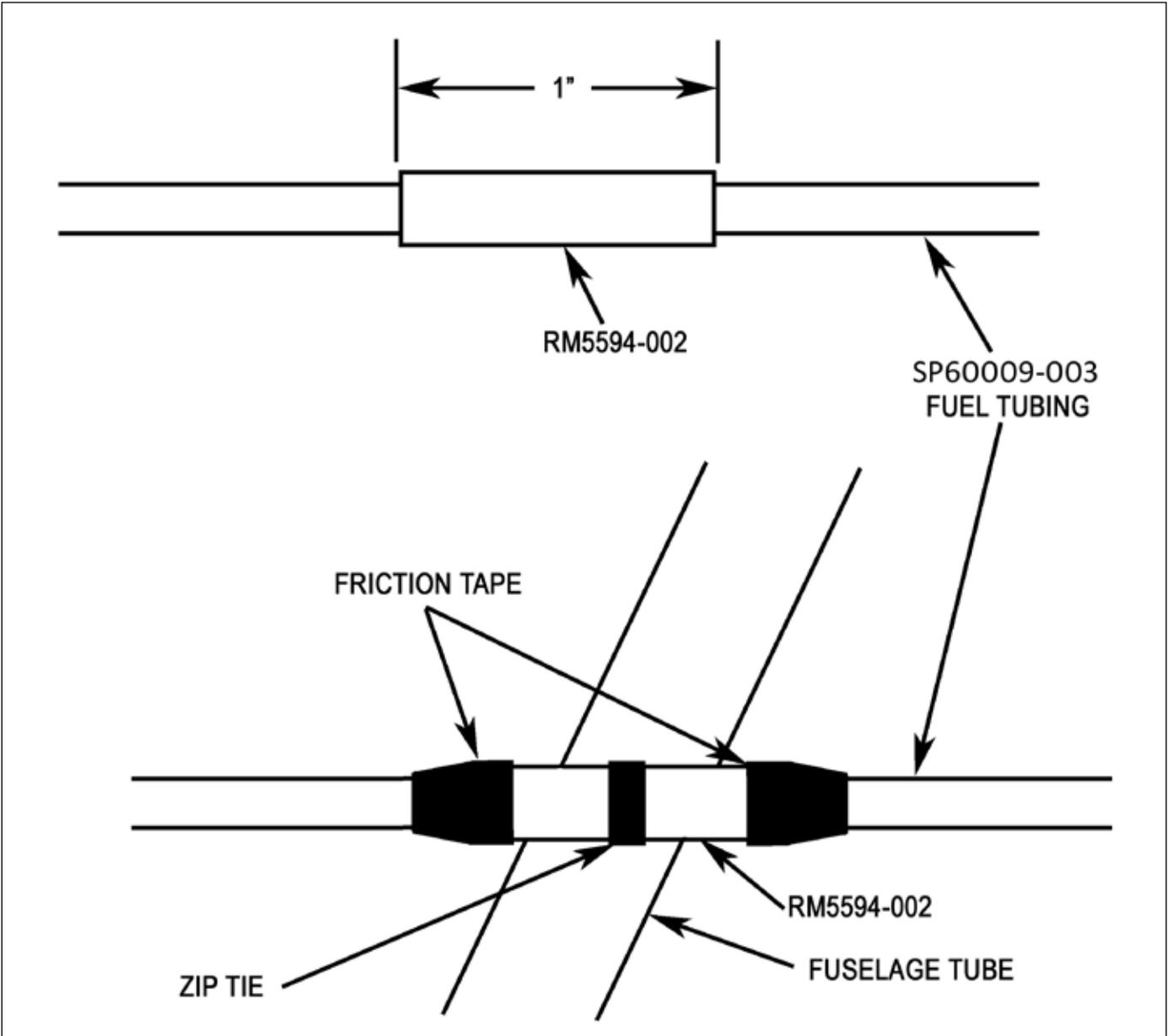
**Photo 147**

**SECTION 14****STEP 2. APPLICATION OF PROTECTIVE TUBING**

The application of protective tubes in this step and the application of chafe protection in Step 12-5 must be coordinated. The idea is that a protective tube will need to be applied wherever a fuel line will be attached to the fuselage tube with a zip tie. Obviously, you need to know where the chafe protection will go.

Wherever a fuel line is tied to the aircraft structure, a reinforcement tube should be applied over the fuel line tubing to keep the fuel line tubing from being crushed and to avoid fretting. The method is simple. Slide an appropriate length of the larger tubing over the fuel line and center it over the fuselage tube. Apply a piece of friction tape to the fuel line at each end of the reinforcement tube per Figure FS25. The friction tape will keep the cover tube from moving.

*Photo 148**Photo 149*



**Figure FS25**

**SECTION 14****STEP 3. INSTALL FITTINGS**

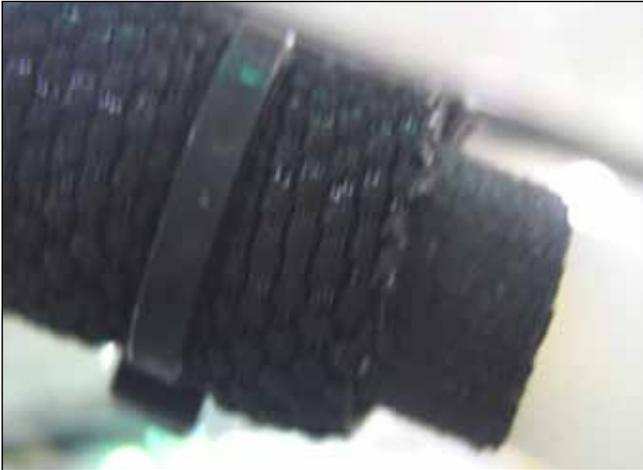
Photo 150 to the right shows the parts needed for each fitting in the order that they need to be assembled.

Assembly begins by placing the nut and ferrule onto the tubing. Then the small reinforcement insert is placed into the end of the tube. The tube is then slid into the fitting until it “bottoms out”. This “bottoming out” will be obvious. There is no practical way to push the tube too far but you can fail to fully insert. The last step for each nut is to tighten the nut using your fingers. Your goal is to tighten “finger tight” not “wrench tight”. Your finger tight fitting should look roughly like those in Photo 152 below.

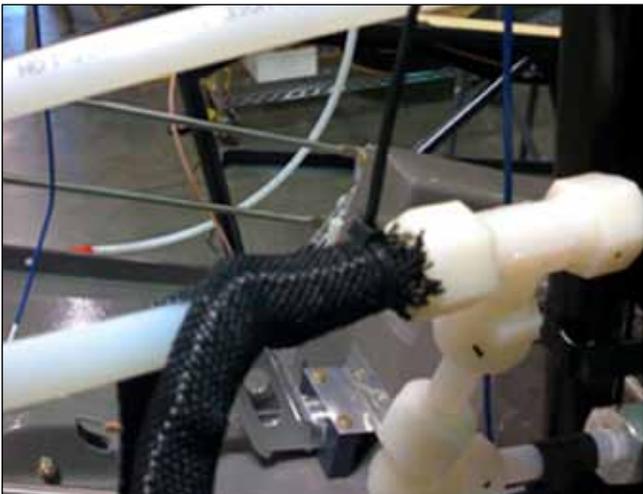
In case you are wondering about the dots in the picture to the right, they will serve two purposes. The dots on the body of the fitting (elbow or “T”) indicate that the ferrule and reinforcing insert are in place. The dots on the nuts indicate the hand-tight position. The nut will be tightened later 1½ to 2 turns past finger tight.

**Photo 150****Photo 151****Photo 152**

Install the fittings at the line crossing points that you have produced in step 12-1 above. It is probably easiest to work outward from the fuel selector but you may install the fittings in the order you choose. The fittings as shown in Figure FS24. The following list is the mission for this step (working away from the fuel selector):

**Photo 153****SECTION 14****STEP 4. APPLY CHAFE PROTECTION**

The first order of business in applying chafe protection is to learn the procedure. The procedure starts with application of a friction tape wrap to the fuel line where the chafe protection will end. A thickness of two wraps and a width of one to two tape widths are sufficient. Next, the chafe protection sleeve is wrapped around the fuel line.

**Photo 154**

The chafe protection is manufactured as a spiral rather than a closed circular cross section tube. You apply it by opening the spiral and then you wrap it back around the tube reforming the spiral. The chafe protection should be positioned so that it is near the end of the tape (see Photo 154). Once positioned, place a zip tie at the end of the chafe protection. You're trying to compress the chafe protection over the friction tape to prevent the chafe protection from sliding along the fuel line.

**Photo 155**

Another part of the fuel system protection is standoffs. This simple standoff is made from two zip ties and a bit of friction tape. Begin by applying two wraps of friction tape to the metal tube. Then one zip tie is applied to encircle the tube and the fuel line with chafe protection. The second zip tie is applied at right angles to the first loop between the two tubes. The resultant figure of eight should be drawn moderately tight to keep the fuel line from moving. Trim the ends of both zip ties flush being careful to not leave a sharp end.

Another method for the standoff involves placement of a piece of tubing to increase the distance over the method employing just a zip tie spacer. The assembly of this standoff is the same as the previous method, except that you need to thread the zip tie through the spacer tube before drawing the zip tie tight.

Employ either method as necessary to position the fuel tubing with the necessary slope. It is desirable to have the fuel tubing “going downhill” with no places in the line that particles or water could accumulate. The next steps set out the application of chafe protection to selected parts of the fuel system.

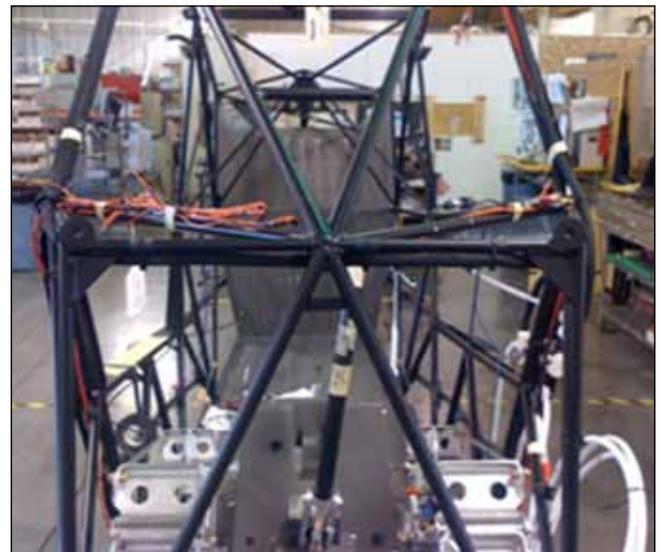
**First Application:** Apply chafe protection to fuel line number 10 starting from the right hand fuel tank front and continuing down and across the front of the fuselage.



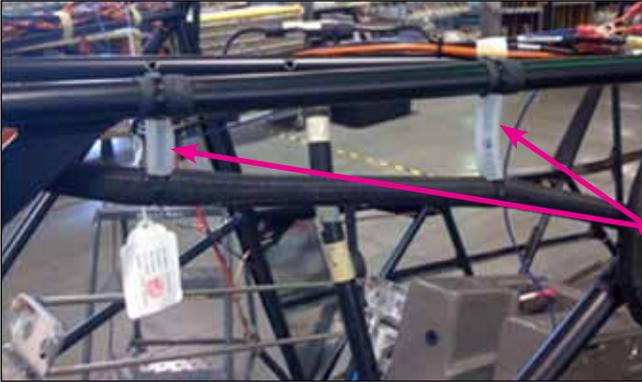
**Photo 156**



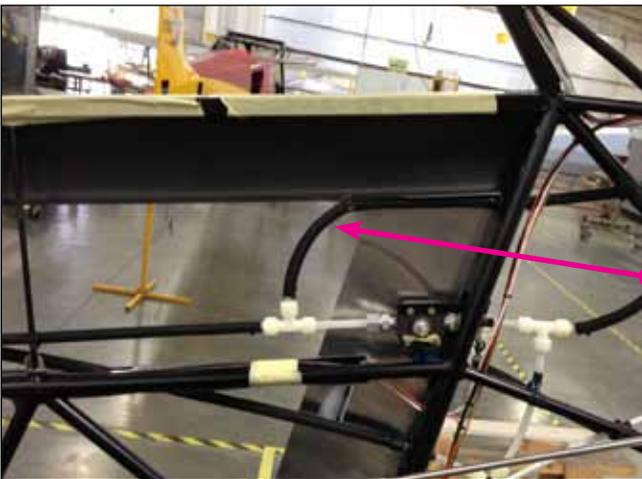
**Photo 157**



**Photo 158**


**Photo 159**

Use a two zip tie standoffs at these locations.


**Photo 160**

Then continue the chafe protection through the cowl spacer to the "T" fitting. Ensure that there are no low spots in the fuel line. This means that you need a constant slope.

**Second Application:** Apply chafe protection to fuel line number 5 starting at the right hand fuel tank aft outlet then continuing downward past the aft cargo compartment side panel.


**Photo 161**

**Photo 162**

Here is a photograph of the lower end of this line.



The fuel low point is below this fitting.

**Photo 163**

Secure the fuel line with chafe protection along the line of this tube.



**Photo 164**



**Photo 165**

**Photo 166**

**Third Application:** Apply chafe protection to Line number 10 starting from the left hand fuel tank front outlet continuing downward to the “T” forward of the fuel selector.

**Fourth Application:** Apply chafe protection to line number 11 from the left hand fuel tank aft outlet continuing downward to the middle of the top stringer.

**Photo 167****Photo 168**

Drill a hole in the bottom lip of the top stringer and use that hole to zip tie the fuel line to the stringer.



**Photo 169**



**Photo 170**

**For the plastic fittings:** Starting from the finger-tight position set previously, turn the compression nut 2 turns with an open-end wrench. Use the dots you applied previously to assist in counting the number of turns.

**For aluminum fittings:** Tighten the aluminum nuts 2½ turns. Check entire fuel line system to ensure that there are no low spots. There should be four open lines at the fuel tank positions and two more for the line to the firewall. If there are more “opens” than that, please find out why. You missed something.



**Photo 171**

## SECTION 15 FUEL SYSTEM TESTING

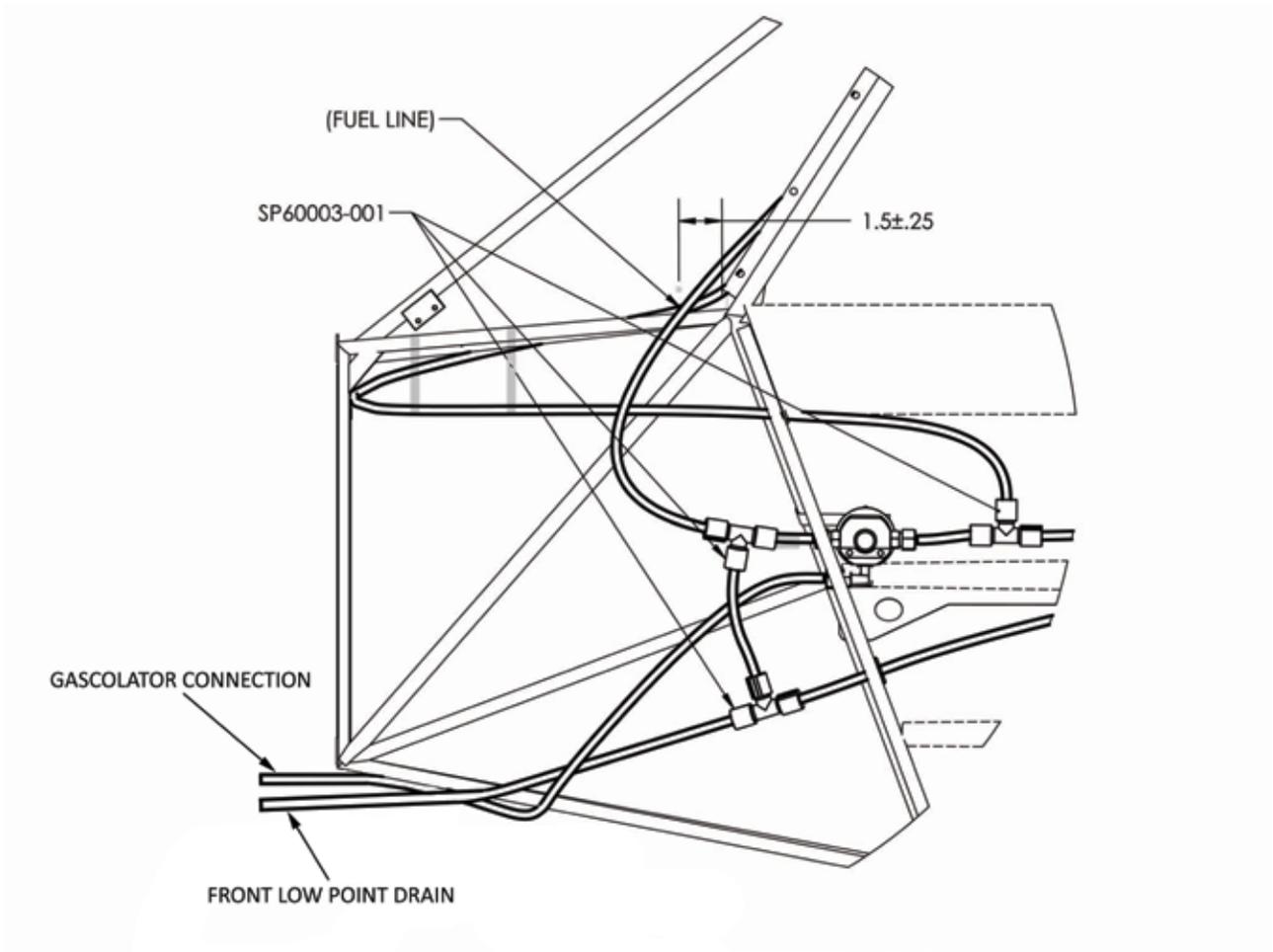
For this test we'll need a few things, some pre-mixed soap water, magnifying glass and flash light, arm with these aid will ensure the system is solid.

You will need to connect the two fuel line at the upper fuselage on each side with 3/8" automotive fuel line and hose clamps as shown in Photo 172. Do not tighten these hose clamps at this time, you will need to check the airflow through these lines first.



**Photo 172**

Using a small piece of the same 3/8" fuel line, slide it over the low point drain at the front of the fuselage per Figure FS26. You will need to plug the other end of this fuel line to make it seal. a 3/8" bolt and hose clamp should work nicely.



**Figure FS26**

Using a small piece of the same 3/8" fuel line, connect it to the gascolator line shown in Figure FS26 using hose clamps to secure it. Photo 173 will give you an idea of what regulator we use at the factory.

**Photo 173**

Go to the fuel selector valve, ensure that selector valve is, positioned so both right and left sides are opened, this can be check by the air flow coming through the four fuel line that connect to the fuel tanks. Now that air flow has been confirmed, we'll slide a rubber hose on the two fuel lines of left side; repeat this step on the right side. With that done, the fuel fitting are ready to be test. Photo 174 shows the selector valve with the handle placed on and the pointer facing up.

**Photo 174**

Now make sure all lines are tight and connect air to the fuel system. **USE NO MORE THAN 15LBS PRESSURE.** Start at forward fuel fittings. Only do one fitting at a time. Soak fitting with soap solution shown in Photo 175. Use flashlight and magnifying glass for a close inspection of fitting. If bubbles appear the system is not solid. Also look closely for small bubbles, these bubbles will often move together in a upward pattern. This is also an indication of a leaking system. In both cases, these are leaks and need addressed. Try tightening fitting a ¼ turn. If leak still is present, remove fitting, re-inspect fuel line etc. Reinstall with new fitting



Great no leaks, now that the system is solid, remove air regulator, low point hose. Spray down all fittings with denatured alcohol. Use air nozzle to dry fittings.

## FINALIZE FITTINGS AND FASTEN CHAFE PROTECTION

**For the plastic fittings:** Now that the fittings are clean and dry the next step will be application of loctite (RM0568-010). Apply loctite to the exposed threads of plastic elbows and tees (only) at two places, 12 and 6 o'clock positions per Photo 176. Allow one minute drying time.



**Photo 176**

**For aluminum fittings:** Tighten the aluminum nuts  $2\frac{1}{2}$  turns. Do not apply Loctite to the aluminum nuts or fittings.

Now go back to the chafe protection and fasten it to the adjacent tubing with zip ties. A zip tie every 6 to 8 inches should result in tidy lines that will not move later.

Check entire fuel line system to ensure that there are no low spots and that all lines are secured. Place caps or masking tape on the open ends of the fuel lines. There should be 4 open lines at the fuel tank positions and two more for the lines at the firewall.

**LOG & INSPECTION SHEET FUSELAGE # 6**

**Log sheet**

	FABRICATION AND ASSEMBLY TASKS	A	B	C	D
		Mfr Kit/Part/ Component	Commercial Assistance	Am-Builder Assembly	Am-Builder Fabrication
	Fuselage - 24 Listed Tasks				
	Task #				
F13	Fabricate Fuselage Fuel System Components				X
F14	Assemble Fuselage Fuel System Components			X	

**Inspection point**

	INSPECTION ITEMS	BUILDER	ALTERNATE
1.17	Ensure fuel system has been installed per drawing and inserts and ferrules used at all fittings.		
1.18	Ensure bottom drain has proper fitting and is flush with bottom of fuselage.		
1.19	Ensure P/N SC60100 compression fitting assy. is torqued and marked at fuel drain.		
1.20	Ensure fuel system is secure and free of any low spots.		
1.21	Ensure where fuel line may contact fuselage tubing, that chafe tape protection has been applied.		
1.22	Ensure chafe protection applied to lower edge of left side cockpit fiberglass panel to protect the fuel line.		

**Photo 177**

## **SECTION 16      VERTICAL FIN AND RUDDER**

Measure down along the center of the fin post 1.25 inches and mark the tube with a punch. You want the hole to be centered on the tube. Once marked, drill a #12 hole through both walls of the tube as shown in Photo 177.

Next remove the powder coat from the post to assure a positive ground. A ground wire will be attached in a later step.

**Photo 178****Photo 179**

Place the fin assembly into the fuselage mounts.

Ream the rudder hinge bushings with a 0.25-inch reamer as needed to remove any excess powder coat. You want the rudder pins to slide nicely in the holes (not sloppy – just a nice slide).

Next, attach the rudder to the fin using hardware set forth in Figure FS27. Ensure the bottom of the rudder counter balance is evenly spaced from the top of the fin. You can adjust this by changing the extent of insertion of the fin into the receiver tubes.

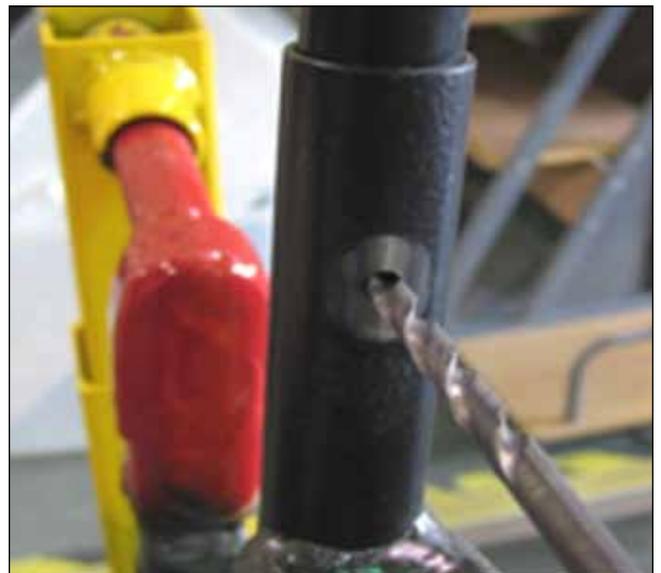
Next, match drill the hole for the fin on the aft tube of the mount using a #12 drill. Install the fasteners per Figure FS27.



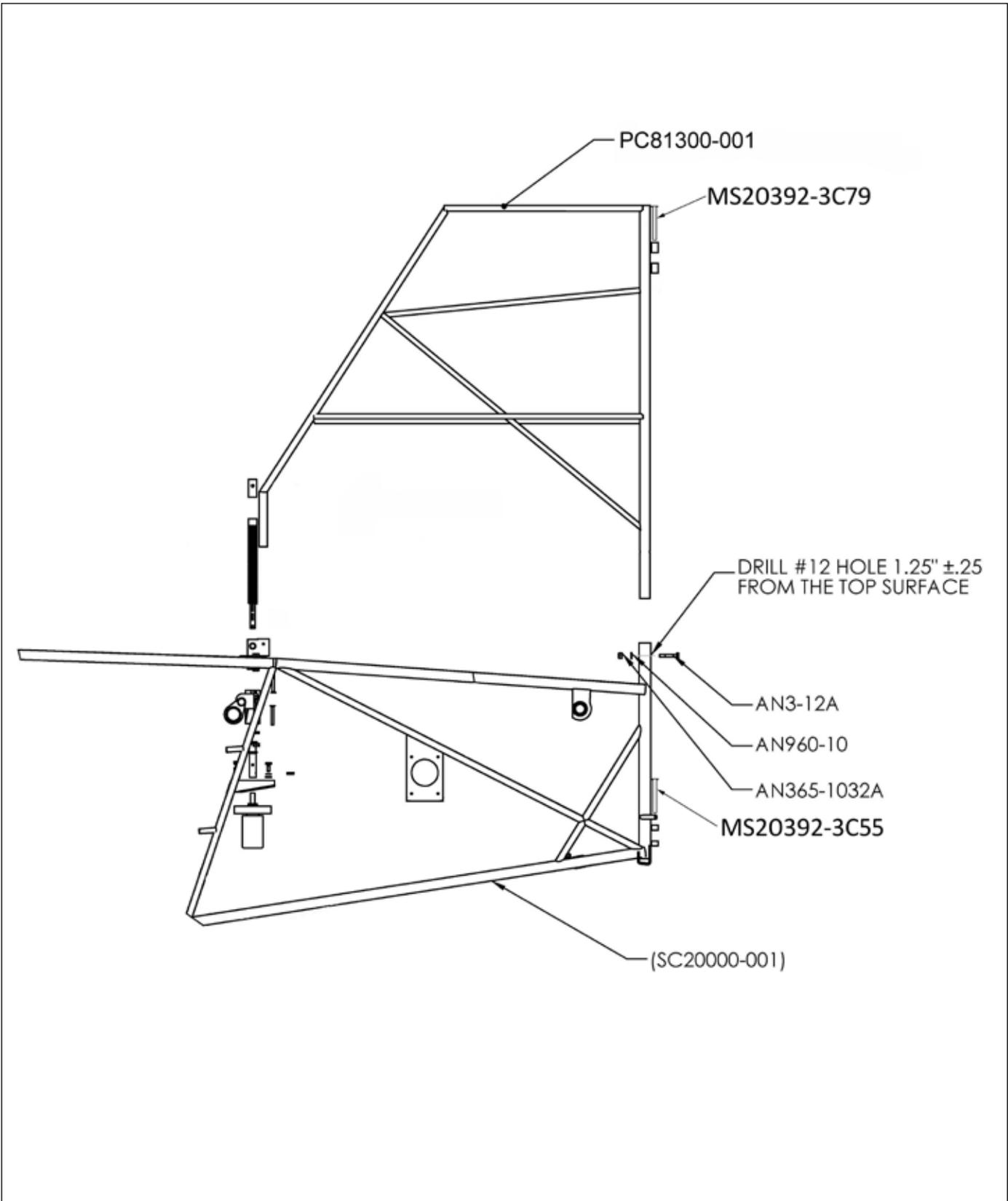
**Photo 180**



**Photo 181**



**Photo 182**



**Figure FS27**

Using a #12 bit, match drill one side of the forward mount of the fin assembly. Place the bolt into the hole, per picture below and match drill from opposite side. Deburr the hole and leave the bolt in the hole to secure the fin. The remainder of the hardware will be installed in a later step. Use Figure FS28 to determine the fasteners.

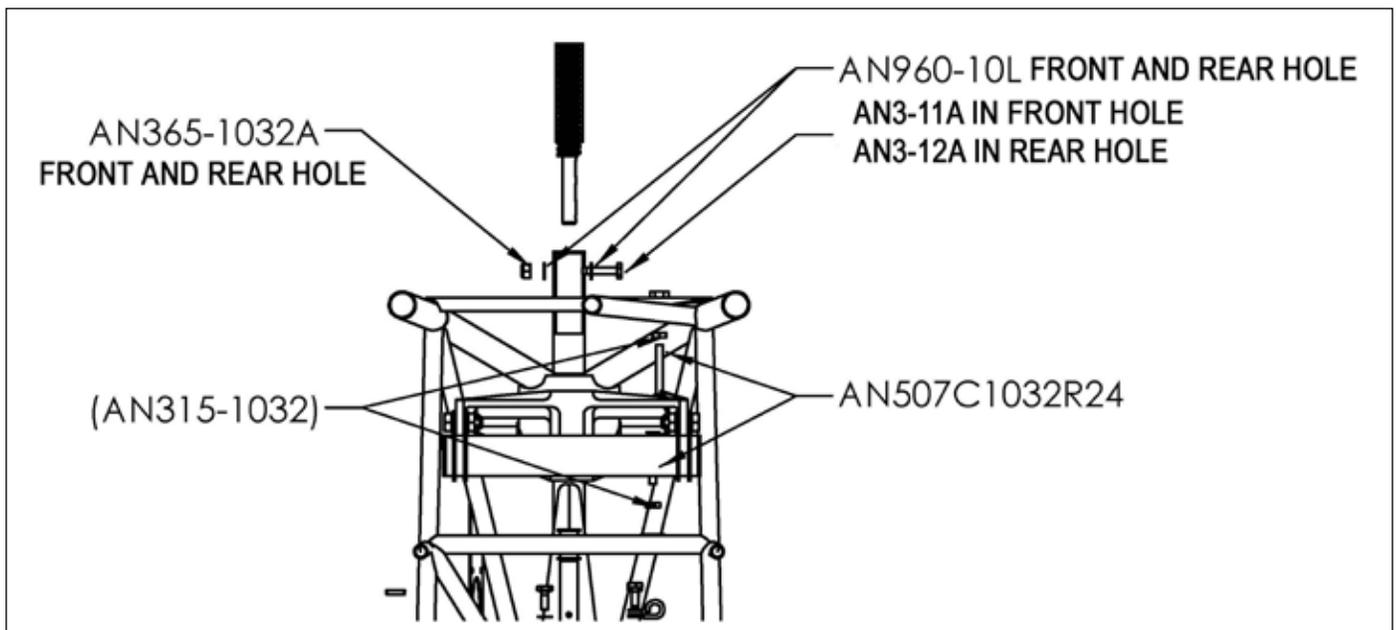
THE BUSHING THAT THE LEADING EDGE FIN TUBE FITS INTO IS SLIGHTLY LARGER THAN THAN THE FIN TUBE. THIS IS NORMAL, DO NOT FILL THIS AREA.



**Photo 183**



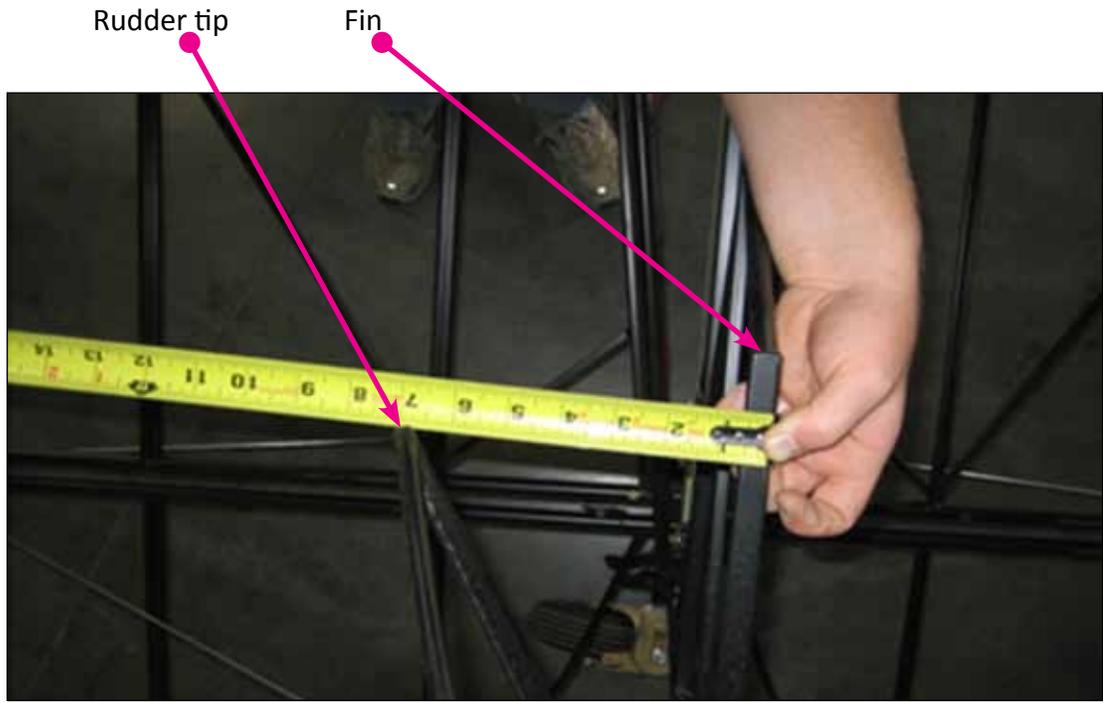
**Photo 184**



**Figure FS28**

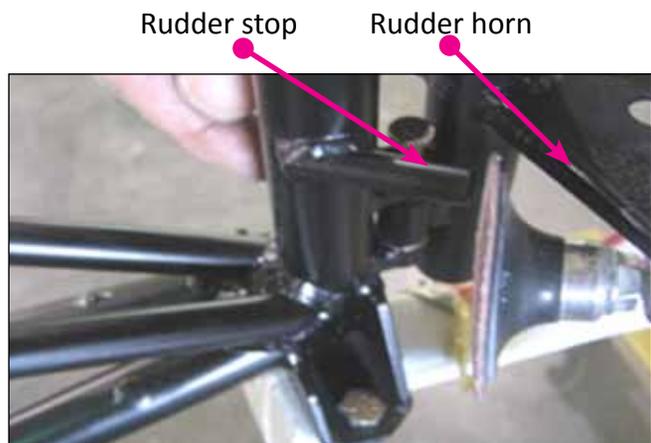
The last part of the vertical fin and rudder attachment step is to adjust the rudder deflection. There are small tubes welded on each side of the fuselage that limit the travel of the rudder. By adjusting the length of these tubes, the travel of the rudder can be adjusted.

First measure the amount of travel left and right. You are measuring at the front of the rudder to the front of the fin. Notice that the measurement is not to the center of the fin but to the edge to make holding the tape easy. The measurement you obtain should be slightly less than 7 inches.



**Photo 185**

If you do not have the full 7" deflection, use a die grinder to remove material from the rudder stop until the 7" deflection is achieved. Proceed carefully as you don't want to remove too much material. When adjustment is complete the rudder stop should touch the rudder horn. Repeat the process for the opposite side.



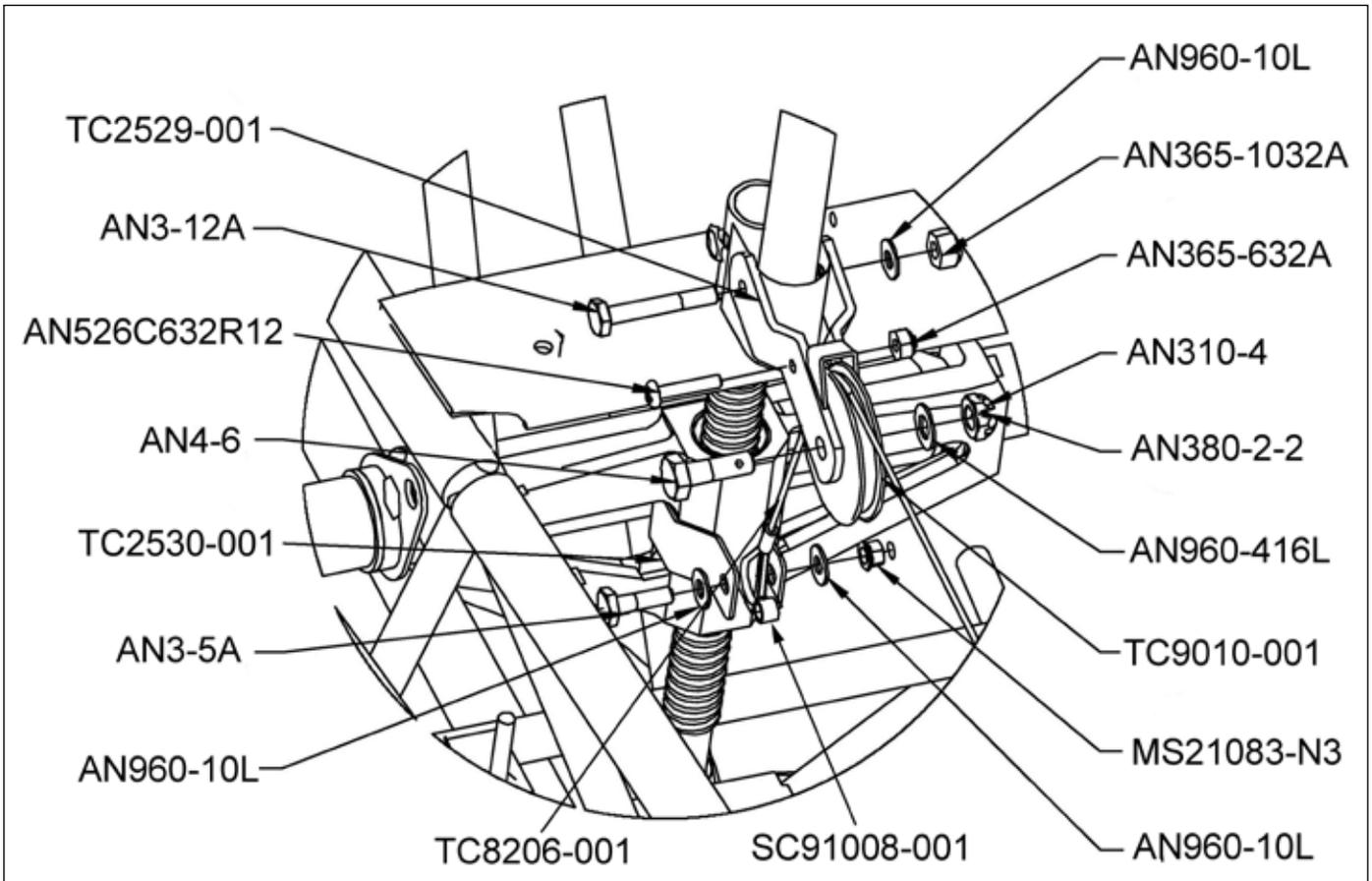
**Photo 186**



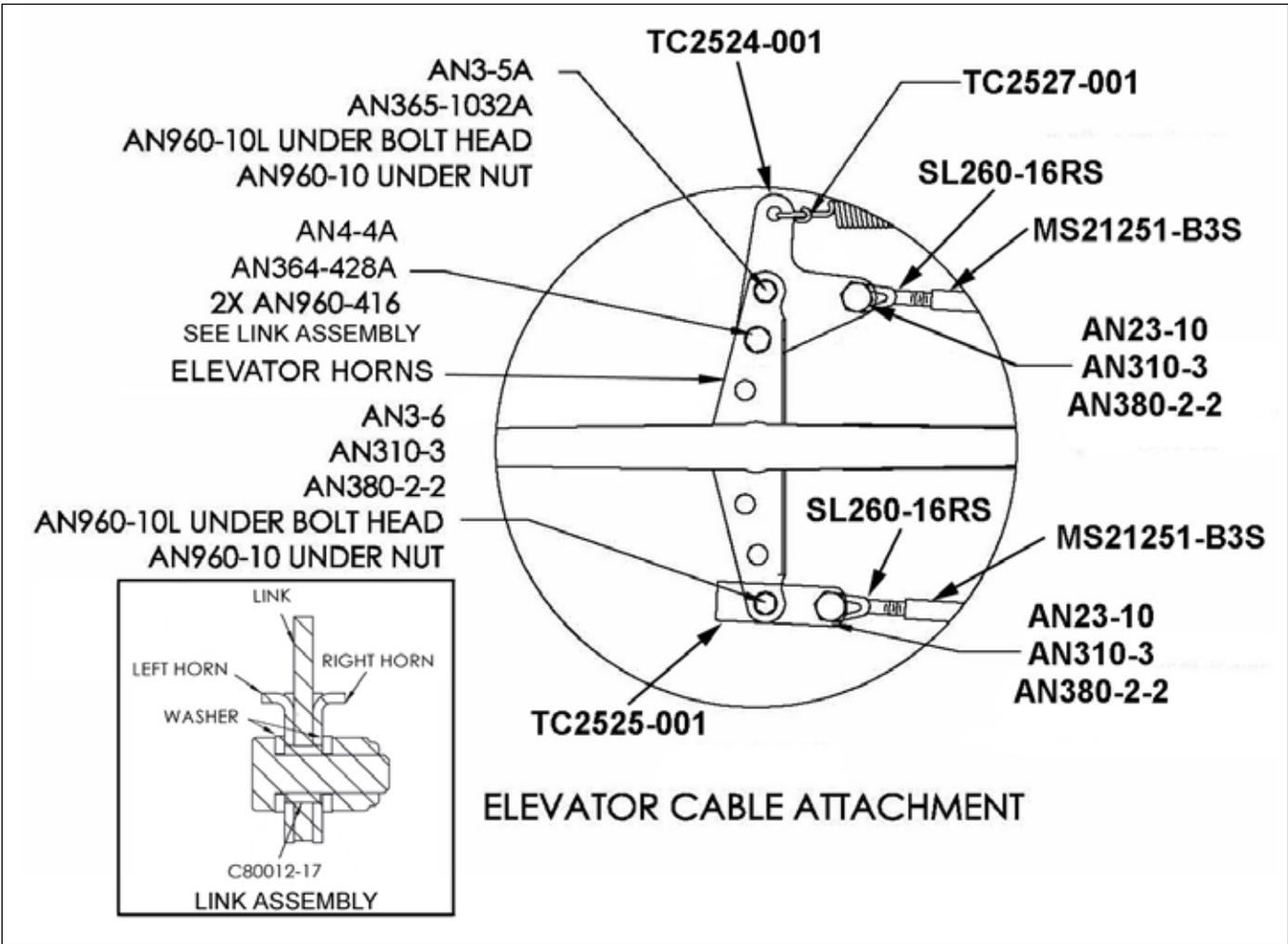
**Photo 187**

**SECTION 17 ELEVATOR TRIM INSTALLATION**

Assemble the parts for the bungee pulley and cable per Figure FS29.



**Figure FS29**



**Figure FS30**

Now that the parts are collected, remove the bolt from the forward fin mount and install the bungee pulley bracket, pulley and cable.

**Photo 188****Photo 189**

Press down on the bracket while securing nut.

**Photo 190**

Secure the bungee spring to the fuselage with masking tape to prevent it from interfering with the next steps.

**Photo 191**

Mark the jackscrew bolt hole location on the centerline of the jackscrew tube. The hole should be at a right angle to the fore-aft direction. The hole should be the same distance from the top of the tube as the fin mount bolt. Once marked, drill the hole using a #12 bit.

**Photo 192**

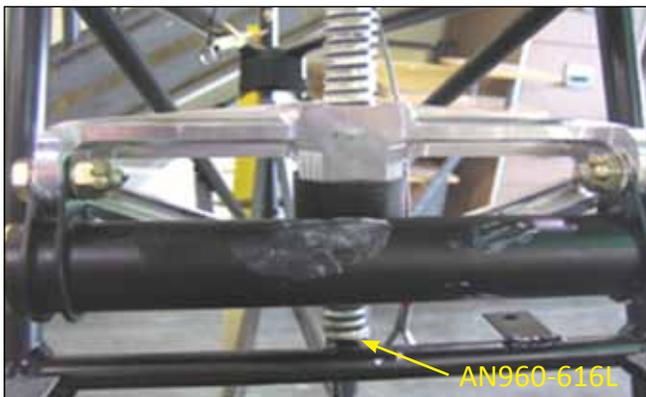
Remember the jackscrew assembly that you put together way back during pre-assembly. It's now time to complete the assembly by installing the jackscrew through the yoke. Be sure that you lubricate the jackscrew with white Lithium grease before you assemble.

**Photo 193**

Install the jack screw through the fuselage and trim assembly per Figure FS31. Screw the jack screw down far enough to allow the jack screw to bottom out on the fuselage.

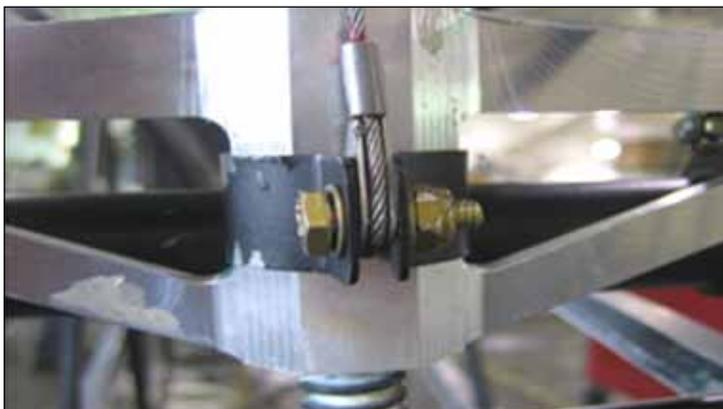
Photo 193 shows another view of the screw that you should have just installed into the trim assembly.

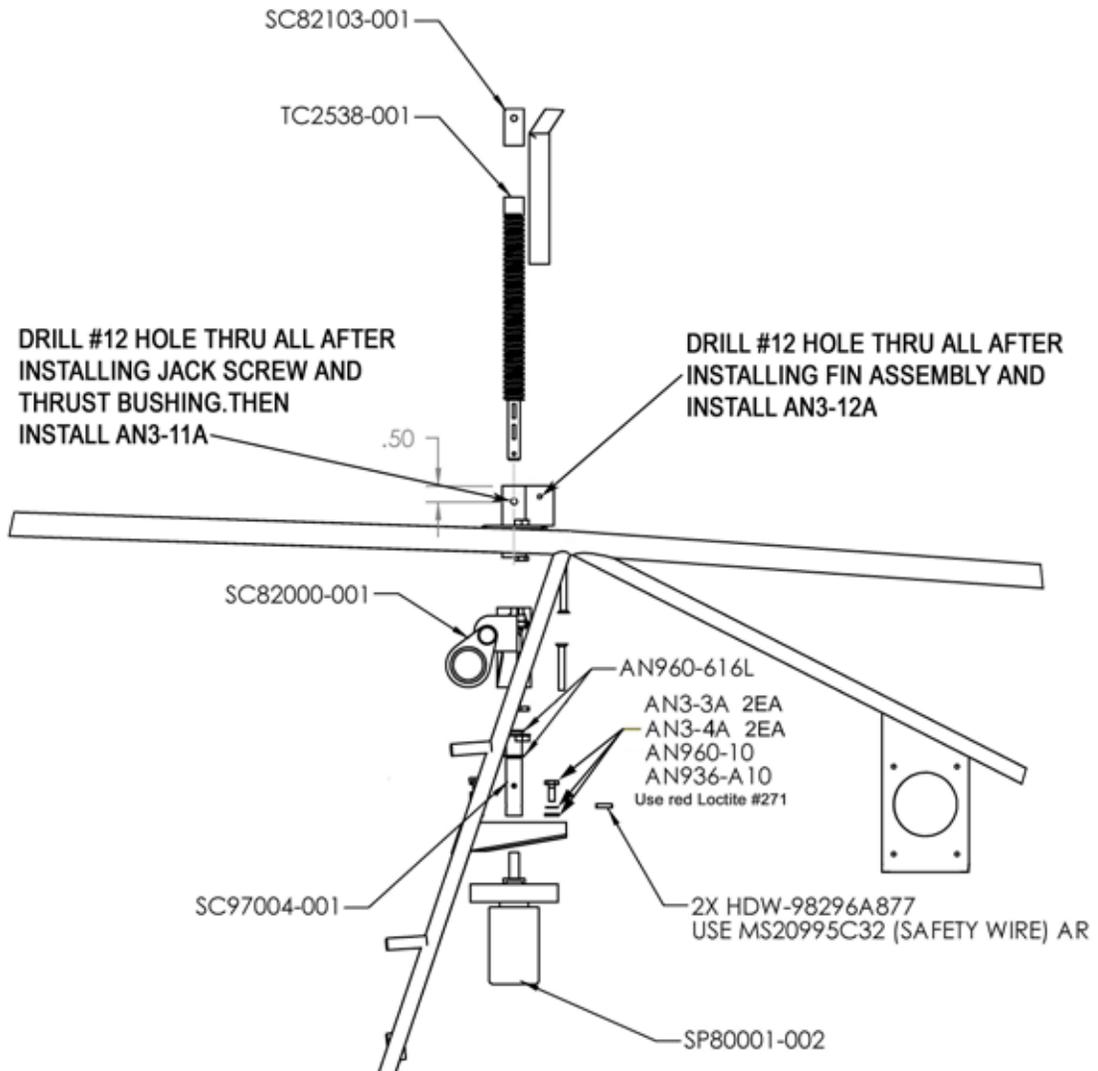
Next fasten the bungee cable to the yoke with fasteners in accordance with Figure FS29.

**Photo 194**

Install the jackscrew thrust bushing (SC82103-001) by match drilling and using hardware as shown in pictures below. When the jackscrew and thrust bearing are installed, there should be no vertical movement in the jackscrew. The jackscrew should rotate freely. Use Figure FS29 & Figure FS31 for selection of the fasteners.

Install the limit switch stop bolts AN507C1032R24 with lock nuts AN315-3R per Figure FS28. You will install one in the top and another in the bottom location. **DO NOT TIGHTEN THE LOCK NUTS AT THIS TIME.**

**Photo 195****Photo 196****Photo 197****Photo 198**

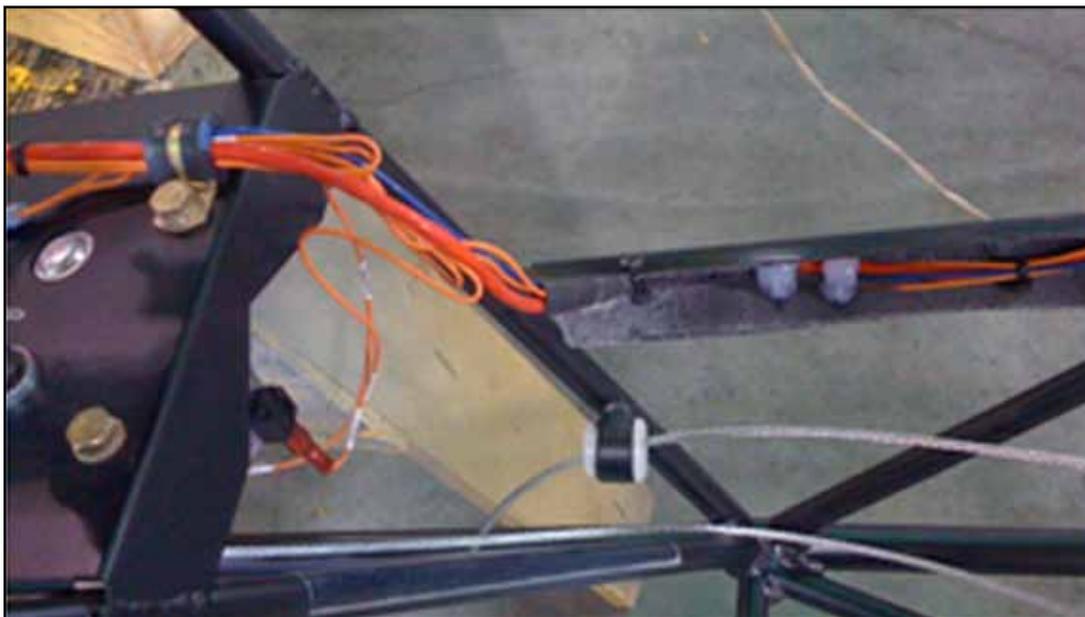


**Figure FS31**

Begin installing the Electric Trim System (“E-trim”) by fastening the harness at the aft end of the left stringer. Use masking tape to hold the harness in place temporarily. Wrap the harness with friction tape at the point the harness makes contact with the stringer. Drill the lip of the stringer with a #12 drill bit and secure the harness with a Zip Tie.

Use spring clamps to hold harness to the inside of the stringer.

The following two photographs show the routing of the wires. They also show the silicone used to fix the position of the wires but that will be applied later.



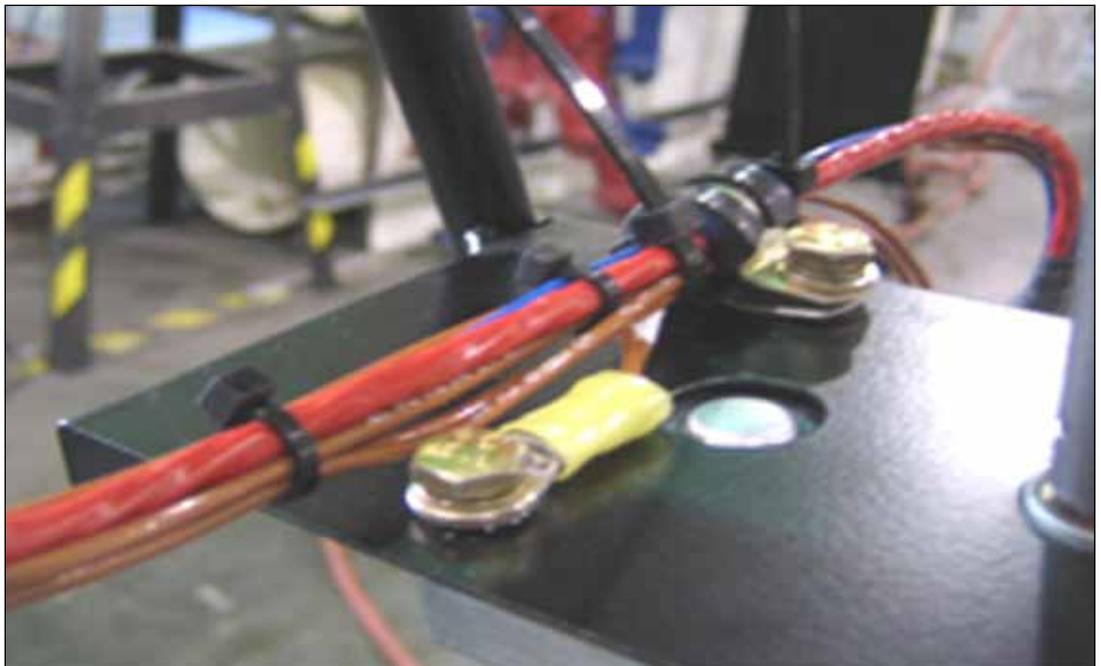
**Photo 199**

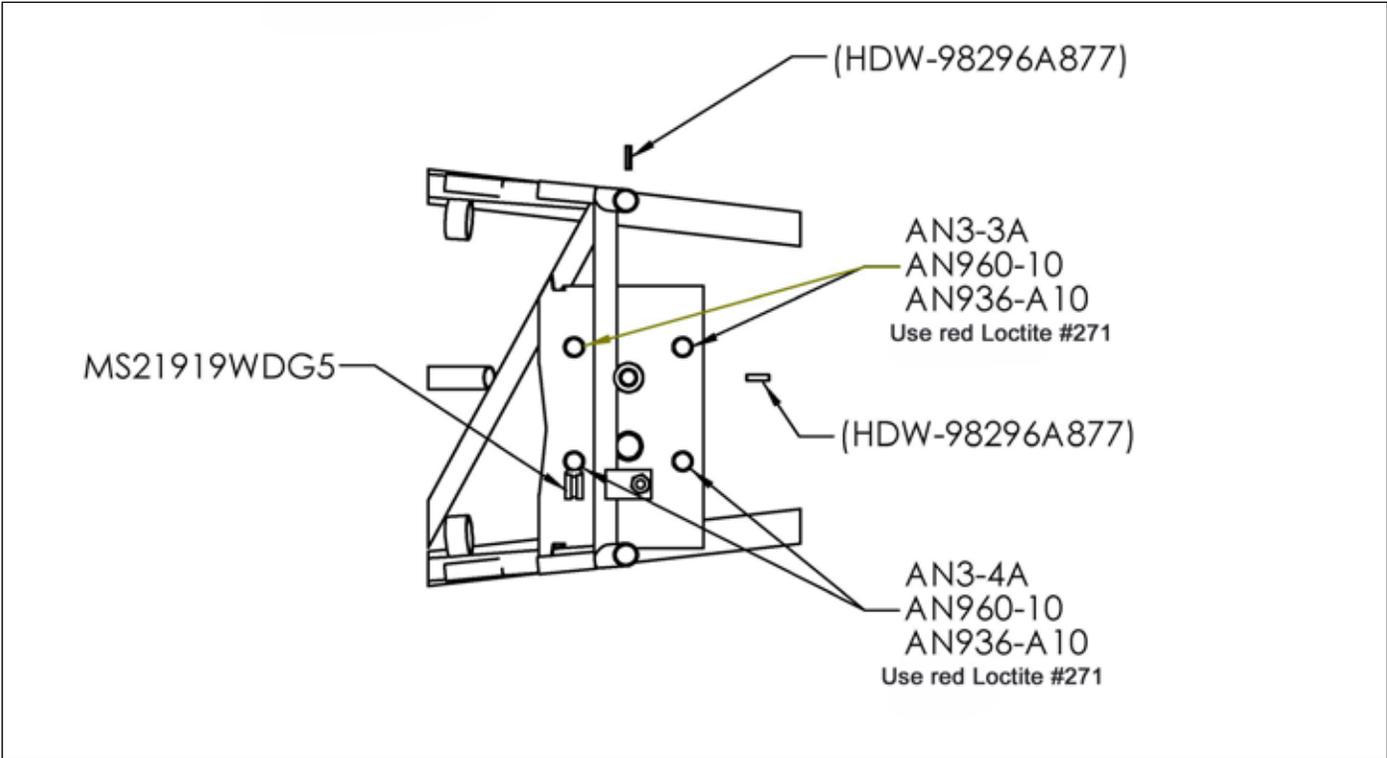


**Photo 200**

**Photo 201**

Fit trim motor into place per Figure FS32 leaving bolts loose at this time. Secure harness with clamp using trim motor mounting bolt.

**Photo 202**



**Figure FS32**



**Photo 203**

The E-trim harness carries forward along the stringer and exits the front stringer near the fuel selector valve through the hole you made previously. Seal the harness exit in the stringer with silicone.

The wire harness continues and is passed through the grommet in the boot cowl spacer.



**Photo 204**

We're going to take a brief side excursion during the E-Trim installation to deal with the ELT antenna wire. If your build includes an ELT, route the ELT antenna wire from the ELT antenna location at the rear through the right-hand stringer to the instrument panel location. Be sure to wrap the antenna wire with friction tape where it will be fastened to the stringer. Attach the antenna wire to the stringer with zip ties every 6 to 8 inches in the same manner as for the E-Trim harness just completed.

**Photo 205**

Wrap friction tape around the bottom of a hole in the lower doorframe.

Place a wrap of friction tape around the optional ELT antenna cable at the same location and use a zip tie to secure in place.

**Photo 206**

Wrap friction tape around antenna cable where it exits the doorframe and boot cowl spacer.

You can see the fabric spacer in the photograph to the right.

**Photo 207**

Use silicone to fasten the E-trim wire harness into the stringer as shown in Photo 209.

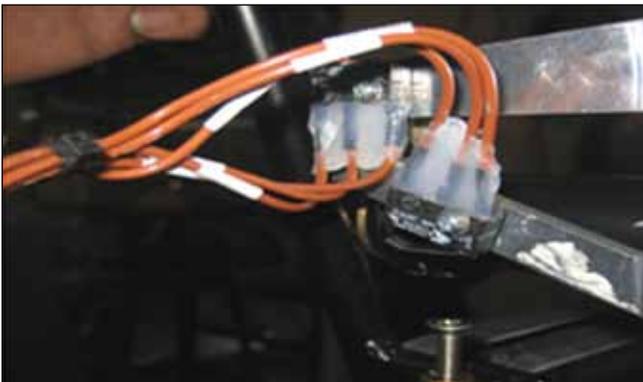
**Photo 209****Photo 208**

**Photo 210**

Here you can see the fastening of the E-Trim harness at the aft end of the stringer.

**Photo 211**

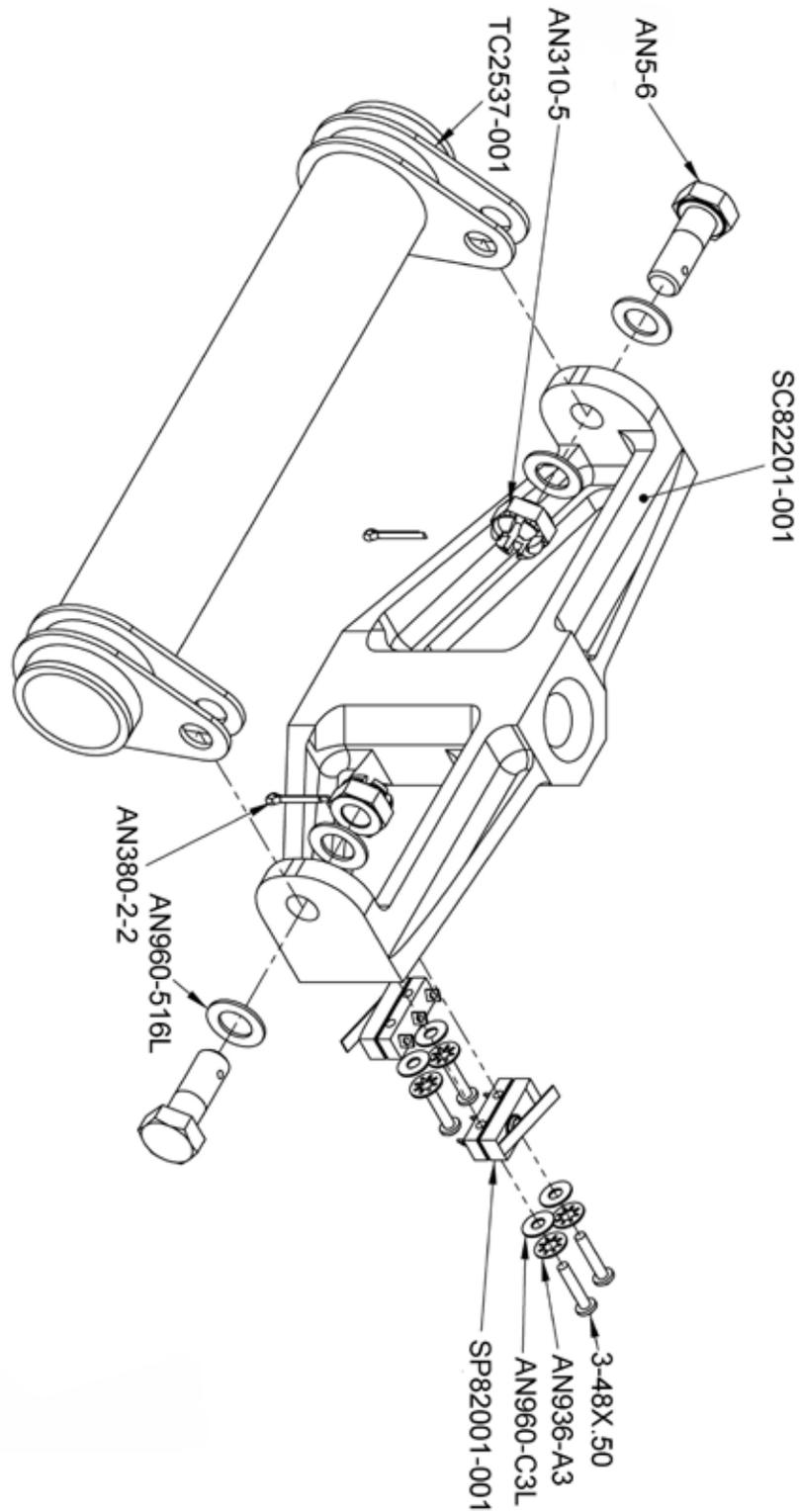
Apply red Loctite to the four E-Trim motor mounting bolts and torque the bolts.

**Photo 212**

Install the E-Trim limit switches to the trim yoke with fasteners in accordance with Figure FS33. **DO NOT USE LOCTITE ON THE LIMIT SWITCH SCREWS.**

**Photo 213**

Secure the harness at the aft end of the fuselage with friction tape wrap and zip ties as shown. Allow enough wire slack to allow the jack to move up and down freely.



**Figure FS33**

**Photo 214**

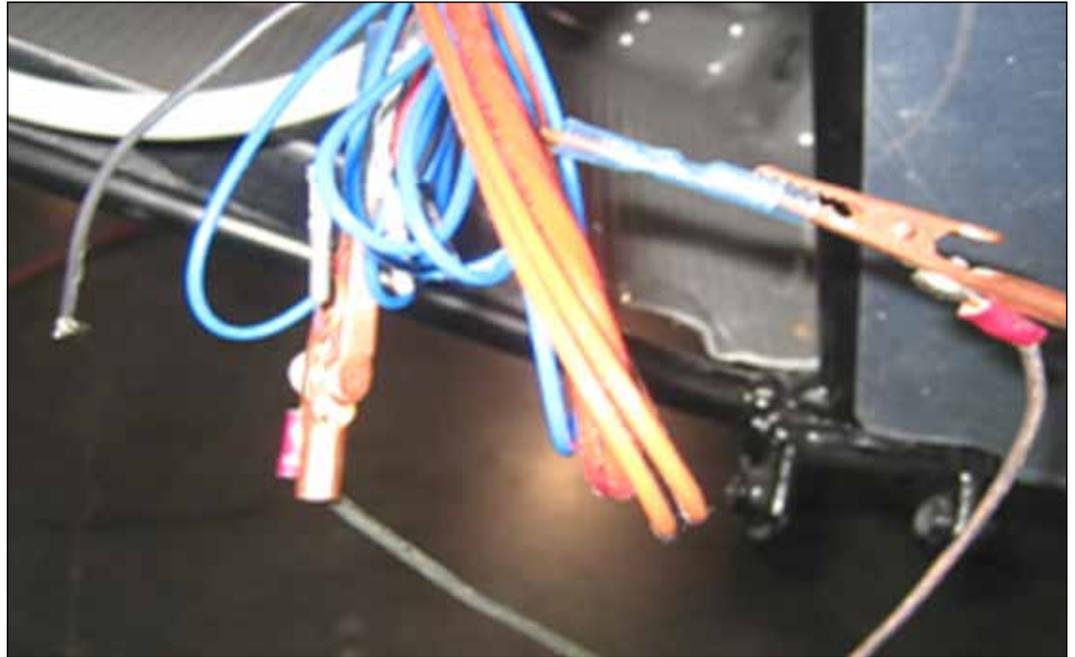
Line up the hole in the bottom of the jackscrew shaft with the top hole in the collar. Use a #30 drill bit to enlarge the hole in the jackscrew shaft to accept the roll pin.

Rotate the jackscrew to align the bottom hole of the collar with the flat of the power shaft. Match drill with #30 bit and insert the roll pin to lock in place.

Fix both roll pins in place with 0.032 safety wire.

**Photo 215****Photo 216**

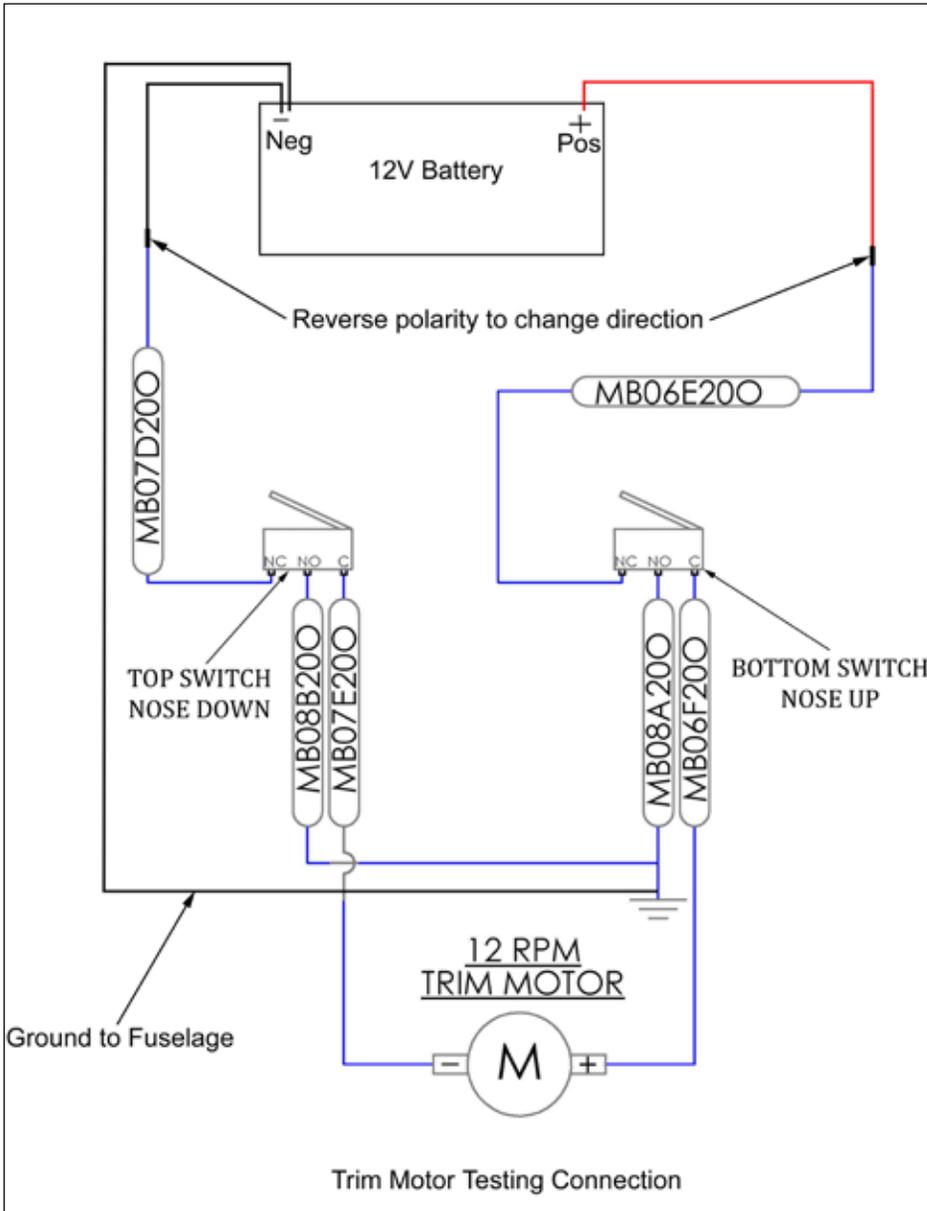
Connect the trim motor to a power supply in accordance with Figure FS34 on the next page. This will assist you in the next step and allow for the proper adjustment of the trim motor limit switches. Connect the ground as shown in Photo 218.



**Photo 217**



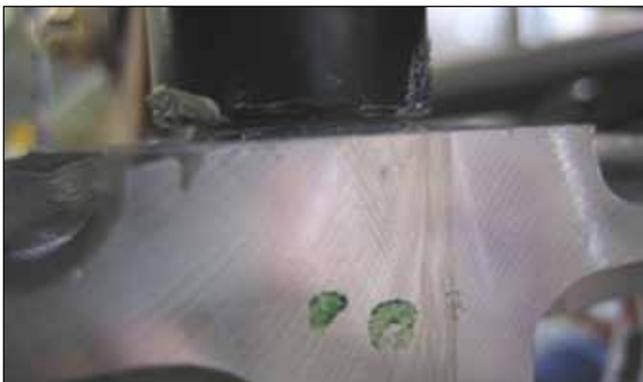
**Photo 218**



There will be two orange wires with connectors installed that are on the E-trim harness, one for up and the other for down. Momentarily touch one of these wires to the positive side of a 12V battery and the jackscrew will move. Have a helper hold the yoke to keep it aligned with the trim stop screws.

Care should be taken in this step to avoid damage to the limit switches, electrically move the trim in small amounts while keeping the yoke straight and the limit switches positioned over the stop screws. Use the power supply to move the yoke to the top of the jackscrew in Photo 219. **NOTE THE APPROXIMATELY 1/16" CLEARANCE BETWEEN THE YOKE AND THE FUSELAGE ON BOTH Photo 219 AND Photo 220.** Set the limit switch stop bolt at this point and tighten the lock nut. Move the yoke to the bottom of the jackscrew in Photo 220 and repeat the test procedure. Apply TorqueSeal to both lock nuts on the stop bolts

**Figure FS34**



**Photo 219**

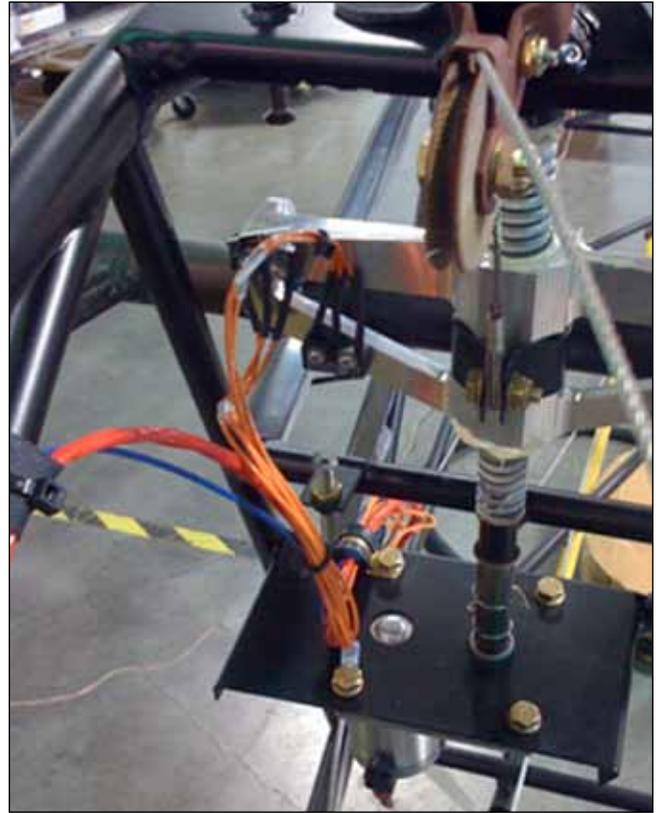


**Photo 220**

The following photographs depict the installation when complete.



**Photo 221**



**Photo 222**



**Photo 223**



**Photo 224**

**SECTION 18 TOP AND FRONT STRINGER**

You can consult Figure FS35 to identify the stringers. Begin by marking the top stringer to achieve a proper fit above the rear baggage back wall. Your goal is to have the tab fit neatly on the top of the back wall. You should eliminate the extra width.

**Photo 225****Photo 226**

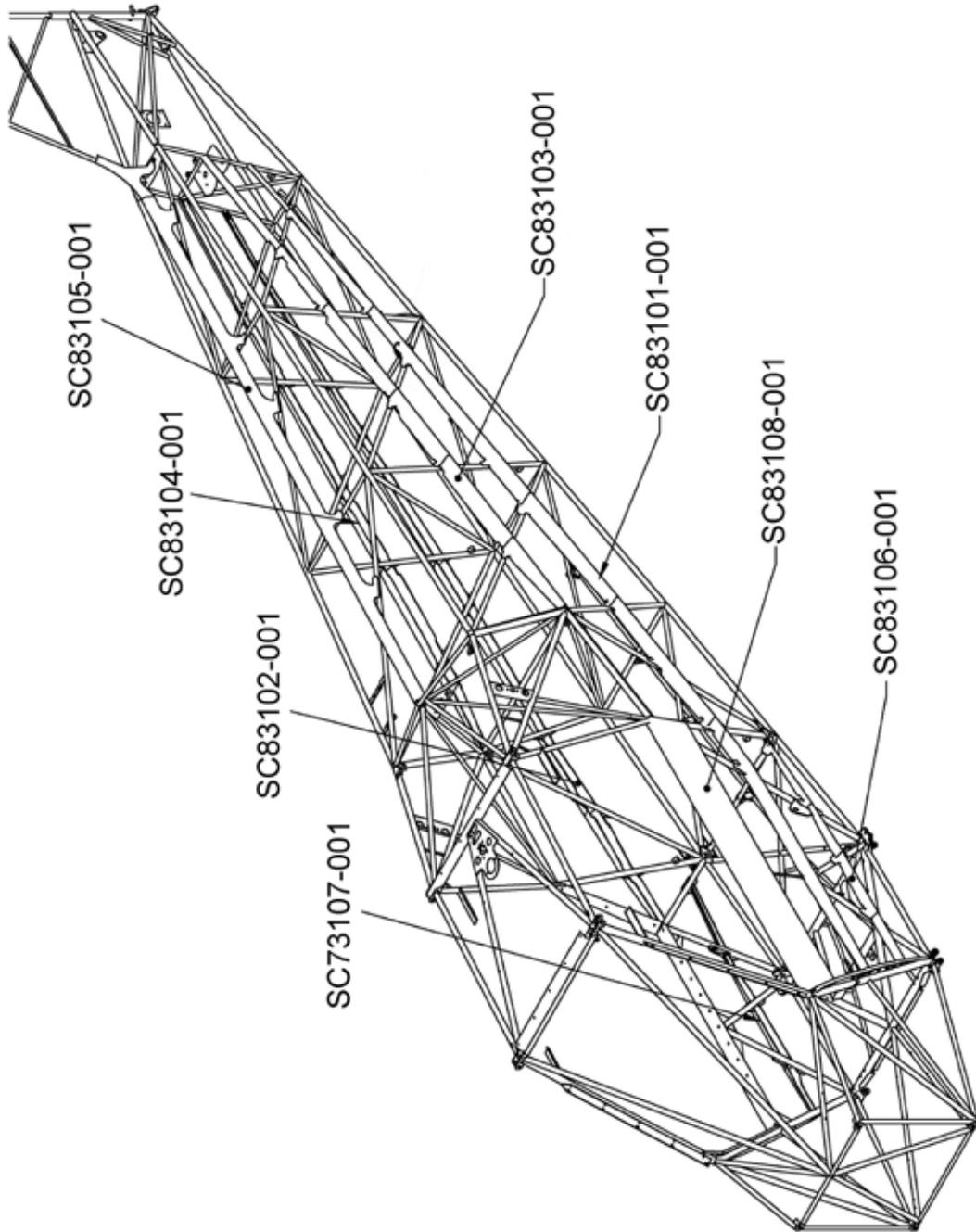
Cut the marked shape using shears.

**Photo 227**

Trim the sheared edge with a die grinder. If you choose you can trim and smooth by using sandpaper.

**Photo 228**

Sand the aft end of the top stringer on the inside to allow for a flush fit on the fin. A smooth transition will make the covered fin look "seamless".

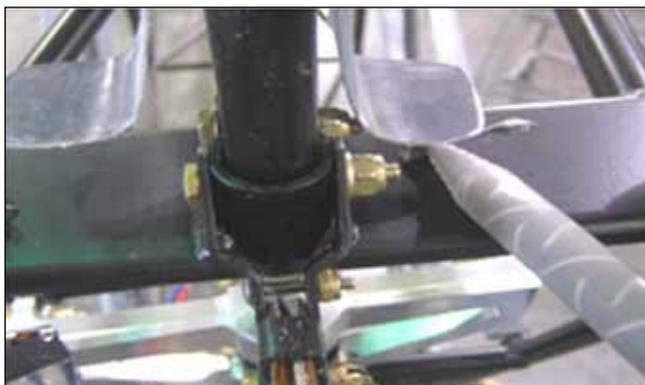


**Figure FS35**

**Photo 229**

Fit the top stringer to the fin and mark for trimming as needed to eliminate excessive “wrapping” of the carbon fiber around the fin tube. After marking, trim the stringer with shears or a die grinder. Sand the cut smooth and test the fit again. The photograph on the right below shows the desired appearance.

Apply Methacrylate to the aft end of the stringer (curve and tabs) and set the top stringer in place.

**Photo 230****Photo 231****Photo 232****Photo 233****Photo 234**

Apply Methacrylate to the top stringer tabs per Photo 232, Photo 233 & Photo 234 and press each into place. Work from the aft end already fastened to the forward end. Use masking tape to hold the stringer securely while the Methacrylate cures. Be careful when applying the masking tape as too much pressure may result in low spots on stringer. Continually check that the stringer has a constant curve without waves while applying masking tape.

Apply Methacrylate to the top edge of the rear baggage compartment. Use spring clamps to hold the top stringer tabs in position after applying the Methacrylate.

Finally, apply Methacrylate to the forward end of the top stringer and press into place. Use masking tape as needed to secure the stringer in place. Once all the Methacrylate has been placed but before it is cured use a straight edge and ensure all stringers are in proper location. Remove any excess adhesive.

**Photo 235****Photo 236****Photo 237****Photo 238**

**Photo 239**

Here is where the cooperation begins. Trim the stringer (Part number SC83101-001) as needed to fit the steel tube (Photo 239), this will allow the fabric spacer to fit flush.

**Photo 240**

Use a die grinder to open the end of the stringer to allow for a wire harness to pass through later (Photo 239).

The fabric spacer should fit flush to the boot cowl spacer.

Next we will work on the two fabric spacers. Make sure the last two stringers (SC83106-001 and SC83107-001) do not hold the fabric spacers out causing a wrinkle in the fabric spacer.

Begin by test fitting the left side fabric spacer (SC53014-001).

**Photo 242****Photo 241**

Be sure that you include fitting the bottom of the fabric spacer to the landing gear attach bracket. The bottom edge of the spacer should be even with the weld line as in the Photo 242.

Attach the bottom stringer to the boot cowl spacer temporarily with a zip tie.

Adjust the zip tie so that the stringer is flush with the fabric spacer. **Do not glue the stringer in place at this time.**

Now let's see if everything is in order. Check the stringer alignment to the fuselage by comparing your alignment to a straight edge.

Now that the left side is just right, test fit the right fabric spacer (SC53015-001) to the fuselage. Attach the stringer to the boot cowl spacer temporarily with a zip tie so that the stringer is flush with the fabric spacer. Ensure that the fabric spacer fits as described above for the left side fabric spacer.

**Photo 243****Photo 244****Photo 245****Photo 246****Photo 247**

Now it is time to fix the front edge of the three stringers in place (SC83101-001, SC83106-001, and SC83108-001).

Apply Methacrylate to the forward end of these three stringers Photo 249, Photo 250, and Photo 251.



**Photo 248**



**Photo 249**



**Photo 250**



**Photo 251**



**Photo 252**

Secure the top left side stringer (this is the one placed in the left window sill) at the aft bottom edge. You will need to drill two small holes in the stringer to the left and right of the tube. Wrap the tube with friction tape to protect the tube and prevent the wire from slipping. Then use 0.032 safety wire to tie the stringer to the tube as shown in Photo 253 and Photo 254. Another way might be to use Methacrylate instead of safety wire to adhere these areas.

**Photo 253****Photo 254**

Now we'll fasten the fabric spacers (left and right). Begin by applying Methacrylate for the right side fabric spacer. The Methacrylate is applied across the top, down the cowl spacer and across the bottom.

Press the fabric spacer into place and secure with masking tape and/or spring clamps.

**Photo 255**

**Photo 256**

When clamping use wood blocks and/or plastic strips to protect the fabric spacer.

**Photo 257**

Lastly, place a bead of Methacrylate on the inside bottom of the fabric spacer.

**Photo 258**

Then apply Methacrylate to the topside of the stringer inside of the right side fabric spacer.

**Photo 259**

When the Methacrylate cures remove the clamps and wipe off any excess Methacrylate with Rubbing Alcohol.

It's been a long time since the last reminder about where we're going. Here's a view that might be yours as you slide buns-first into the cockpit. This is the Deluxe VFR panel. Mentally slide over and lift your feet the rest of the way into your Carbon Cub and go for a Zen flight. The time for your real Carbon Cub flight is not so far away. Stay focused and keep putting in the build time. By the way, nice looking panel, eh?



**LOG & INSPECTION SHEET FUSELAGE # 7**
**Inspection point**

	INSPECTION ITEMS	BUILDER	ALTERNATE
1.29	Upper Bungee Pulley: ensure pulley is installed straight with hardware per drawing.		
1.30	Upper Elevator Bungee Cable: ensure cable move freely at yoke connection.		
1.31	Ensure end is closed on P/N TC2527-001 spring that attaches to upper bungee cable to prevent cable from slipping out of spring.		
1.32	Elevator cable ends have been properly compressed.		
1.33	Ensure elevator trim stop screws have been properly adjusted.		
1.34	Ensure roll pins and safety wire installed in jack screw gear motor coupler		
1.35	Elevator trim motor wire harness secured correctly.		
1.36	Ensure stabilizer yoke assembly installed correctly.		
1.37	Ensure electrical harness is installed and secured.		
1.38	Right boot cowl fabric spacer: ensure installed and secure correctly.		
1.39	Left boot cowl fabric spacer: ensure installed and secure correctly.		

**SECTION 19 REAR FLOORBOARD**

**IF YOU PURCHASED EXTENDED BAGGAGE, YOU WILL SKIP THIS SECTION.**

The next operation is devoted to the rear floorboards. The first step is to fit the aft floorboard (SC90003-001). As in previous steps it will be necessary to make small adjustments in the fit. Mark the aft floorboard, trim the excess with hand shears and/or die grinder and sand as necessary. Apply two layers of masking tape to the bottom of the forward edge of the aft floorboard. Assure that all the screws are in place in the section aft of the seat base.



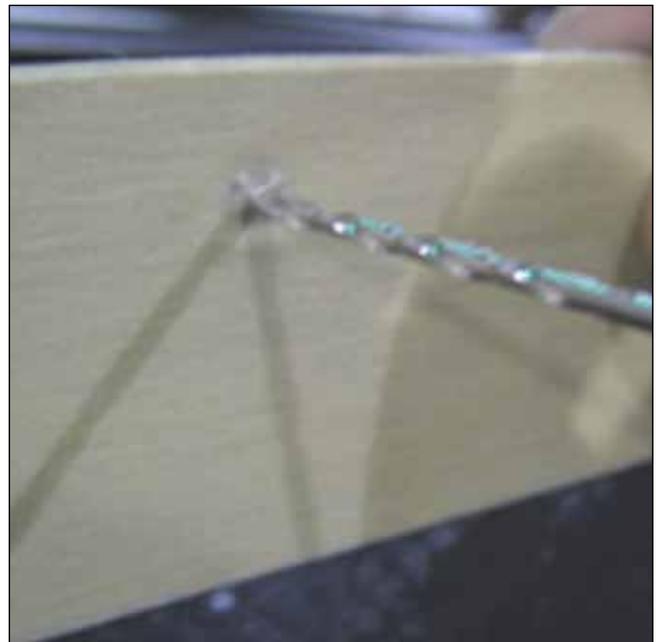
**Photo 260**

Place the aft floorboard in place and tap lightly on top of floorboard. This will cause the screws on the main floorboard to mark the tape on the underside of the aft floorboard. This is a simple way to locate the drill holes in the aft floorboard.

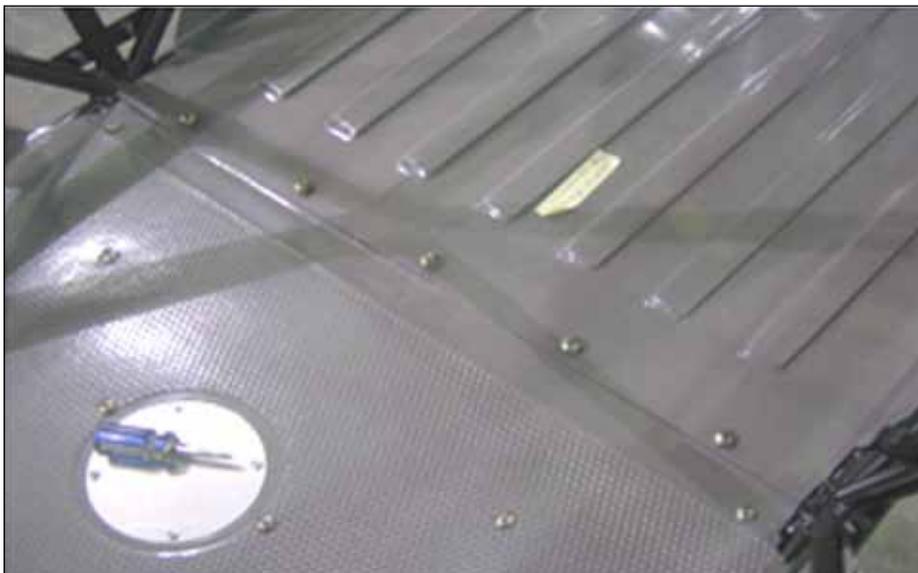
At the center of each screw mark drill a pilot hole with a #30 bit. Then enlarge each hole with a #8 drill bit.



**Photo 261**



**Photo 262**

**Photo 263**

Remove the screws that correspond to the holes just drilled. Remove the masking tape and place the aft floorboard into position. Re-install four of the screws (leftmost, rightmost and two in the middle). Snug the three screws enough to position the aft floorboard but don't worry about tightening them yet. You are simply assuring the position of the aft floorboard for the next operation.

Check to see that the aft floorboard matches the aft end of the seat base (main floorboard) at the outer edges. Mark, trim and sand as necessary to obtain a smooth transition between the two floorboards (both sides).

The seat base (main floorboard) has two holes for the seat belt bracket. It is necessary to drill the aft floorboard in the same locations. The seat belt bracket will be installed in a later step.

Remove the screws in the leftmost and rightmost position so that you can lift the aft floorboard a little.

The remaining two screws in the middle will hold the aft floorboard position. Use a Hole Finder to locate the first hole.

**Photo 264****Photo 265**

After the Methacrylate has been applied place shot bags to hold the floorboard against the fuselage cross tube while the Methacrylate cures.

**Photo 266**

Once again we take a short excursion for the ELT. If the ELT antenna was installed way back when, it is now necessary to secure the antenna.

Wrap friction tape around the center of the antenna. Wrap another piece around the diagonal brace that crosses the rear bulkhead of the aft baggage. Wrap one more piece of friction tape around the diagonal brace aft of the aft baggage.

**Photo 267**

Now, use a short length of rib lacing cord to secure the antenna to both fuselage tubes.

**Photo 268****Photo 269****Photo 270**

Drill a pilot hole through the Hole Finder.

Enlarge the hole to 5/16". Repeat this process for all four holes (2 each side).  
Re-install all the screws into aft floorboard and torque them to 20-25 inch pounds.

Use an air nozzle to blow out chips and shavings from the cockpit area.

The aft floorboard has a ribbed floor which needs to be fastened to the fuselage cross tubes. Apply a bead of Methacrylate to each of the ribs that come in contact with the fuselage cross tube.

It is not necessary to apply Methacrylate to the portions that are away from the tube (the raised portions).



**Photo 271**



**Photo 272**



**Photo 273**



**Photo 274**

## SECTION 20 PULLEYS AND CABLES

For all of the pulley installations, the head of the bolt should be on the right side of the fuselage. The nut should be on the left side. This is true for all bolts on the horizontal axis of the fuselage.

Begin this step by attaching the cable to the front of the torque tube with fasteners per Figure FS36. Route the cable through the pulley cover to the underside of the seat base. Lubricate the bolt and then install the front pulley per Figure FS37 and Figure FS38. Take note of the stick positions, in Photo 276 the stick is full aft and in Photo 277 the stick is full forward. Be sure that you have similar clearances.

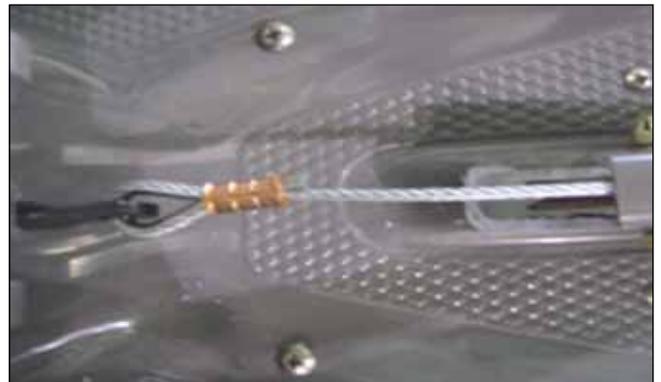
The cable should be around the front pulley at this point. Continue routing the cable by passing it through the front fairlead. Then pass the cable through the fairlead located on the bottom of the aft end of torque tube. Install the cable guard on the front pulley with fasteners per Figure FS38 and Figure FS39.



**Photo 275**



**Photo 276**



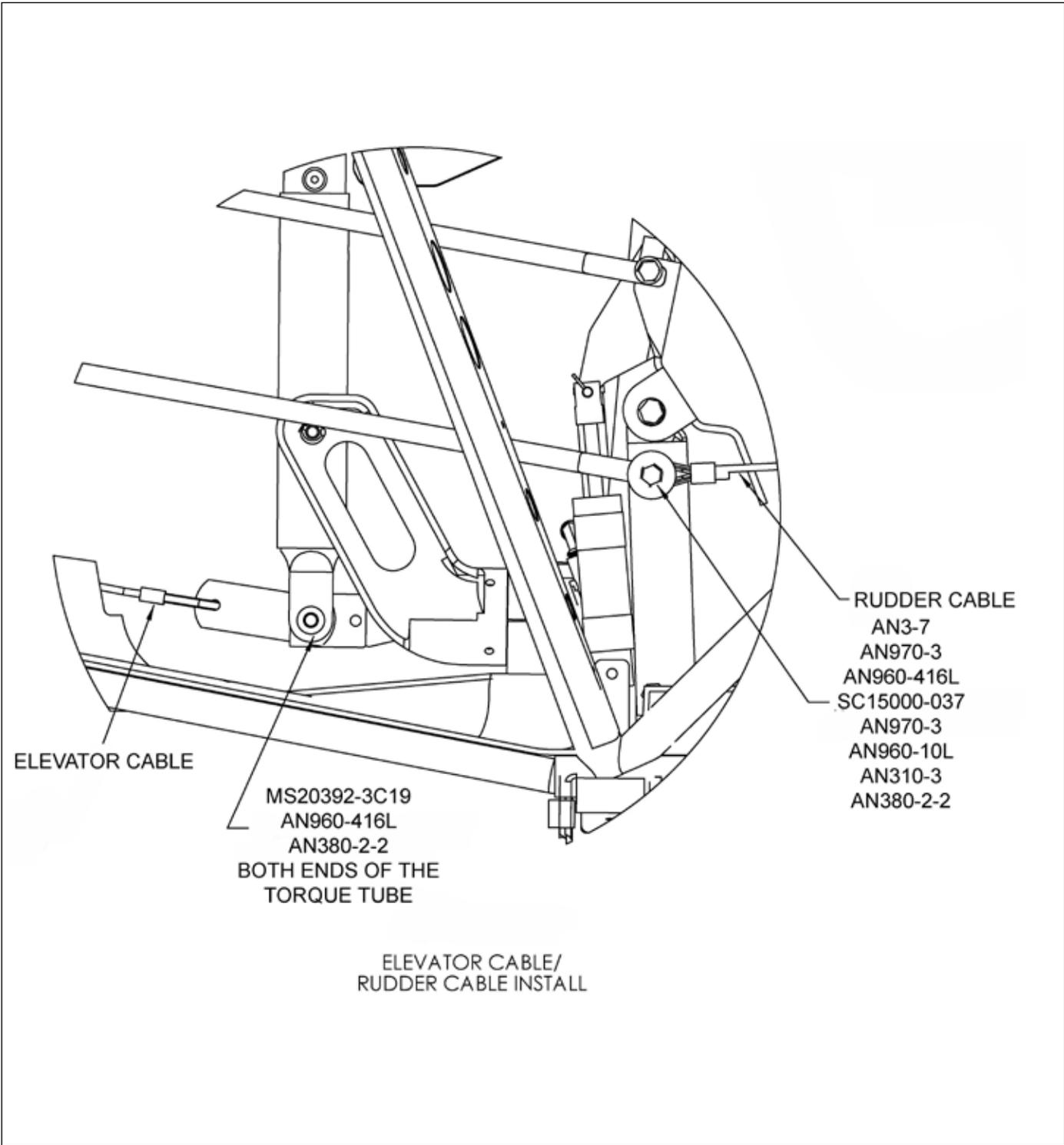
**Photo 277**



**Photo 279**



**Photo 278**



**Figure FS36**

Next we will route the rudder cables. Begin at the rear-most fairlead holder (either side) and thread the rudder cable up through the fairleads to the position of the rear rudder pedal.



**Photo 280**

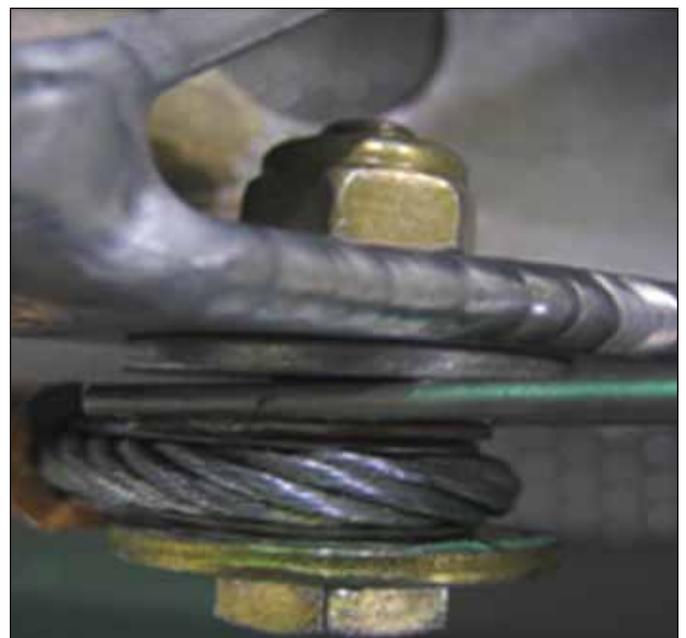


**Photo 281**

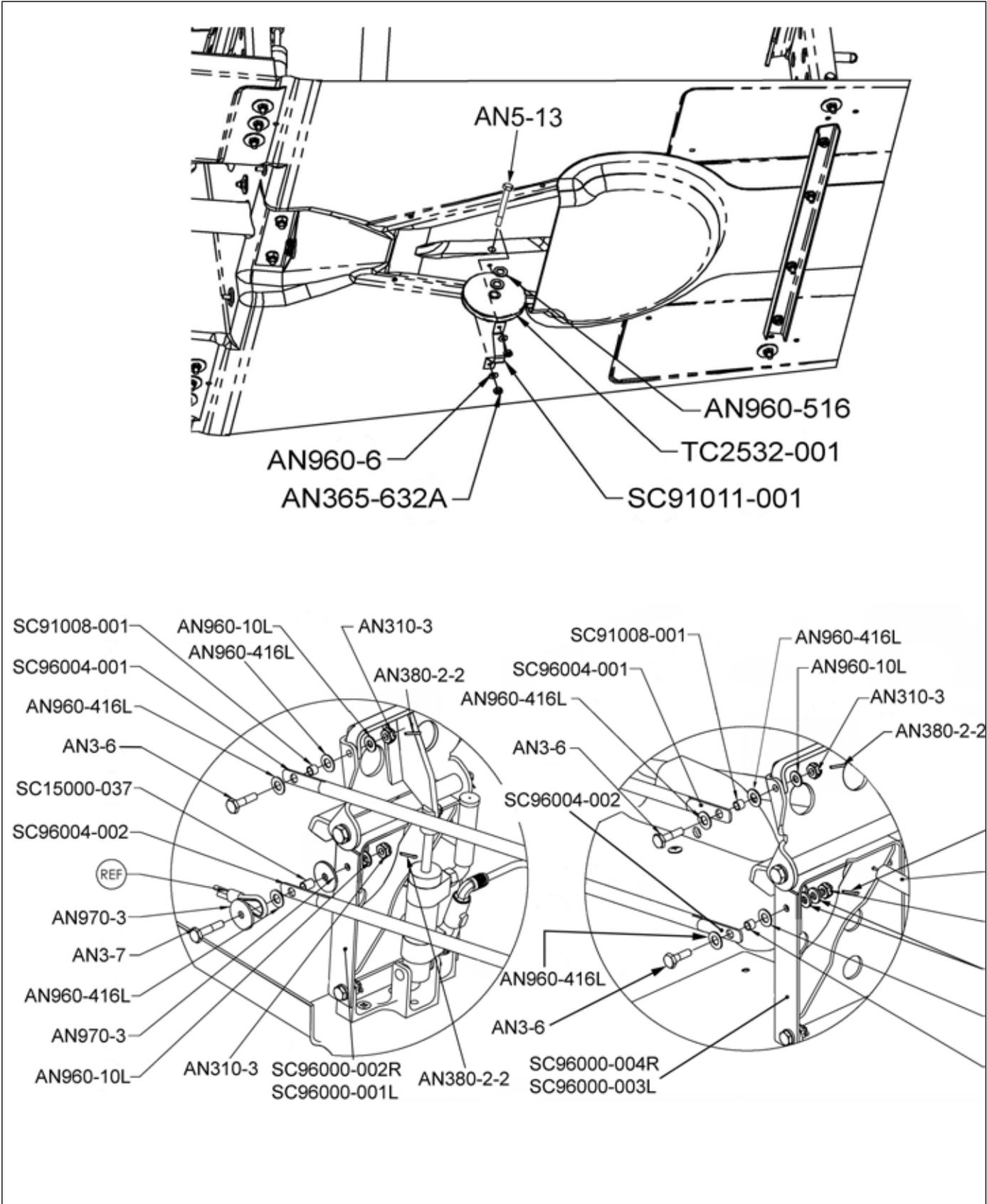
Attach the rudder cable to the rudder pedal with fasteners per Figure FS37. Repeat the installation for the other rudder cable.



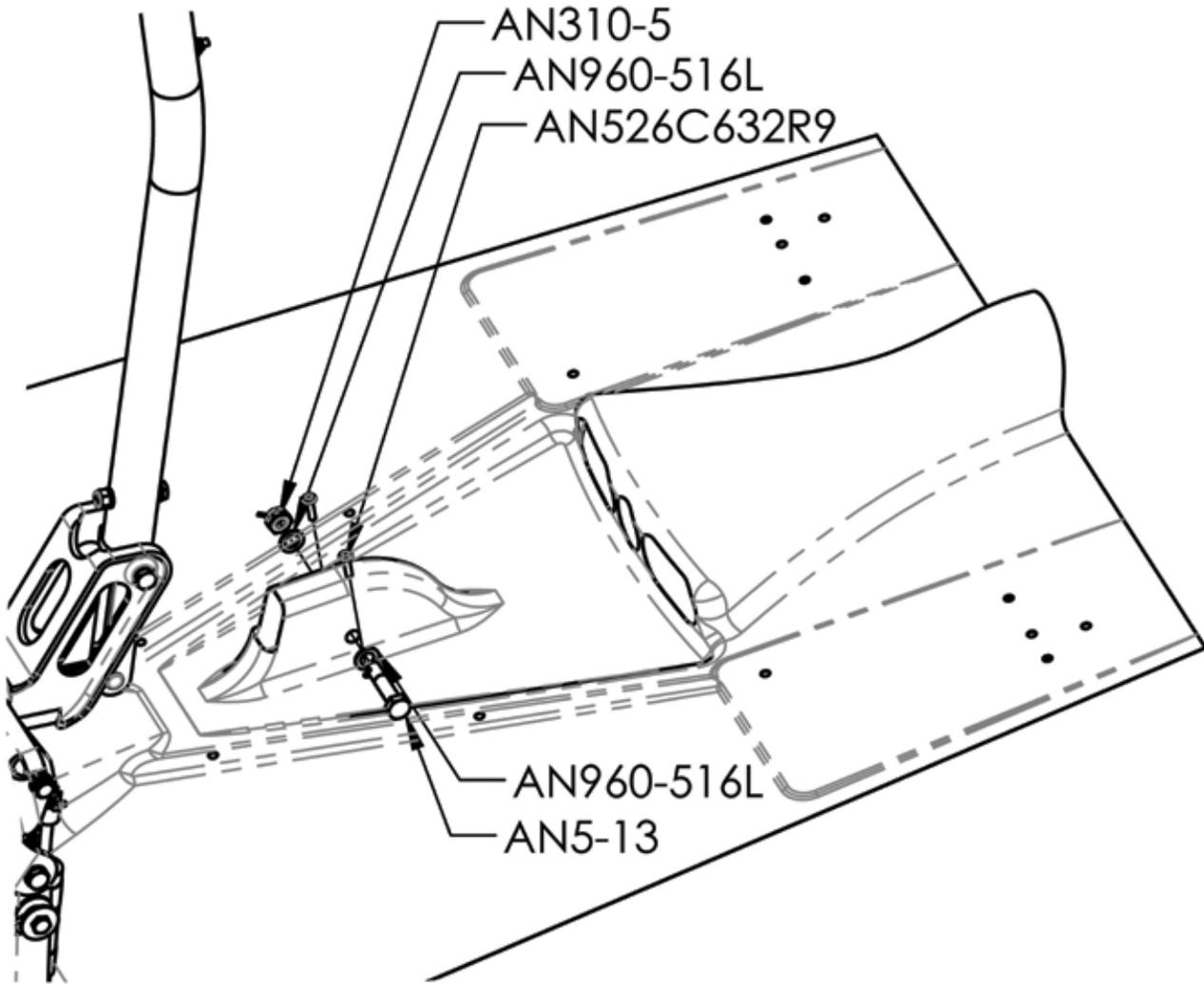
**Photo 282**



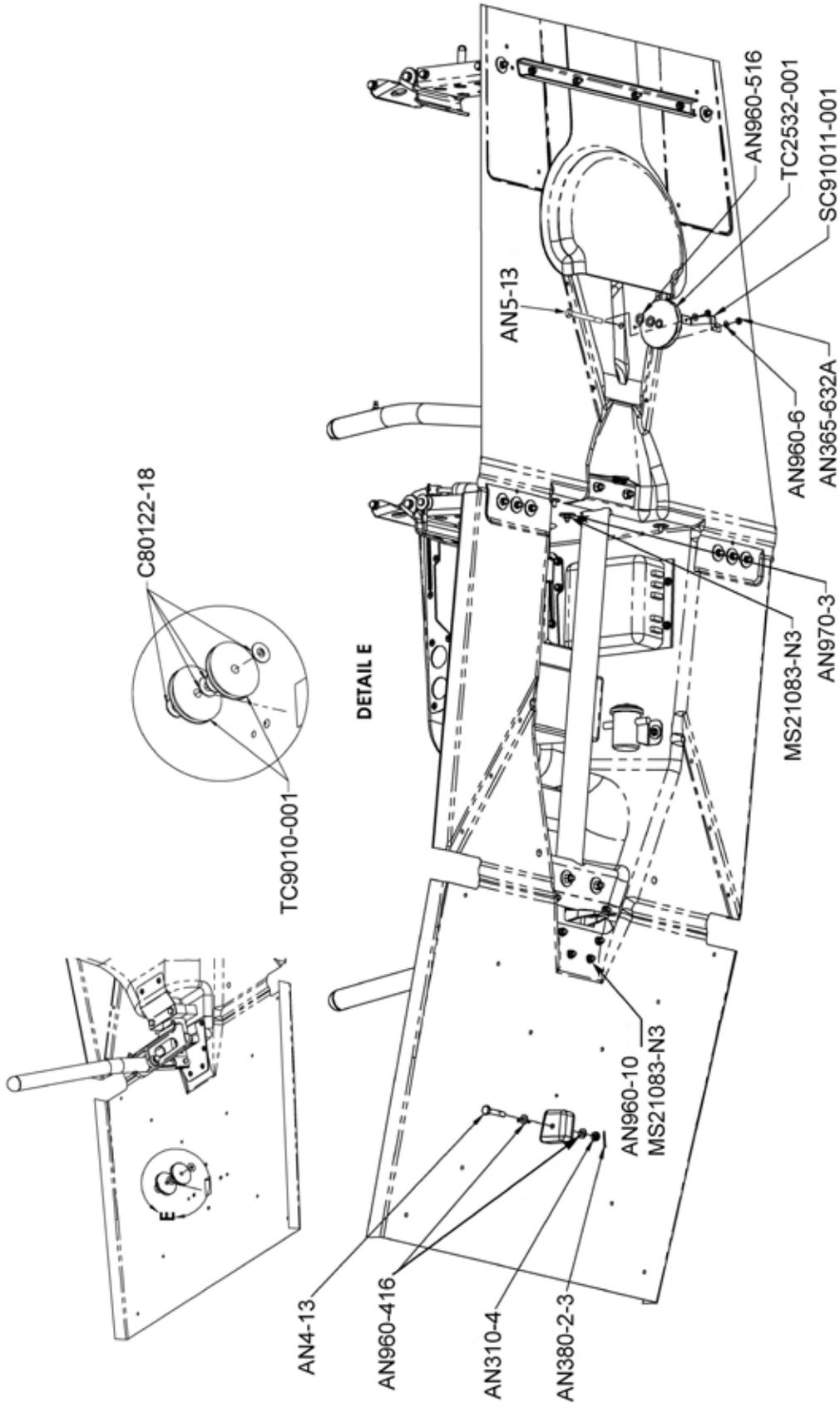
**Photo 283**



**Figure FS37**

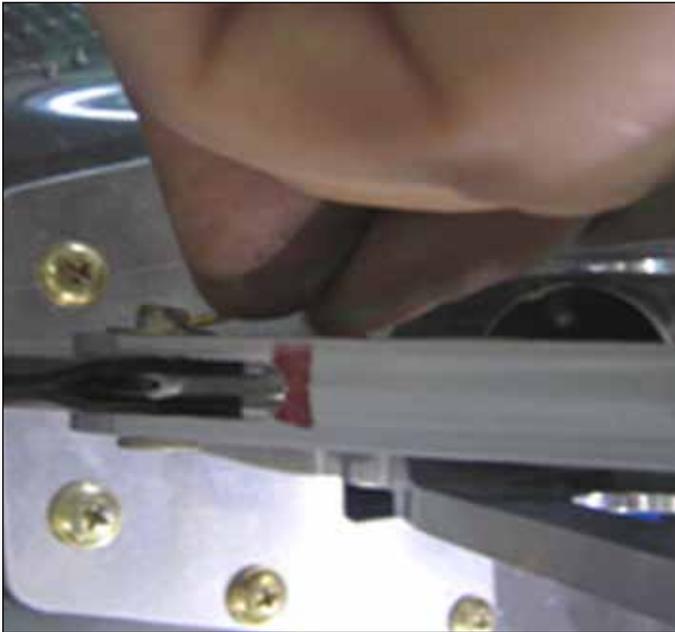


**Figure FS38**



**Figure FS39**

Next, attach the cable to the rear end of the torque tube in a similar manner to the front end of the torque tube.

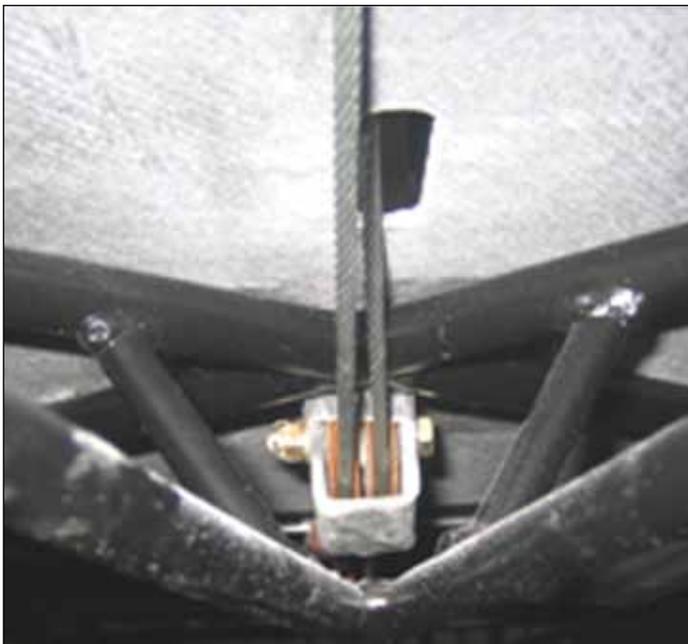


**Photo 284**



**Photo 285**

Now we will extend the cables to the position of the elevator cable pulley bracket. Route the cables through the plastic blocks then to the position of the aft set of pulleys. Route the cable attached to the rear of the torque tube through the left opening of the plastic blocks to the left pulley position. Route the cable attached to the front of the torque tube through the right opening in the plastic blocks to the right pulley position. Photo 286 is looking from the front of the fuselage to the back. As above, apply white grease to the bolt and then install the pulleys in the bracket.



**Photo 286**



**Photo 287**

**Photo 288**

Install the aft end of the rudder cables to the rudder horn.

Install the 2-piece rudder cable fairleads and the retaining spring clip (TC9109-001 and TC9105-001). There are 3 positions for the installation on each side of the fuselage.

Apply a bead of silicone to each of the fairleads to secure in place.

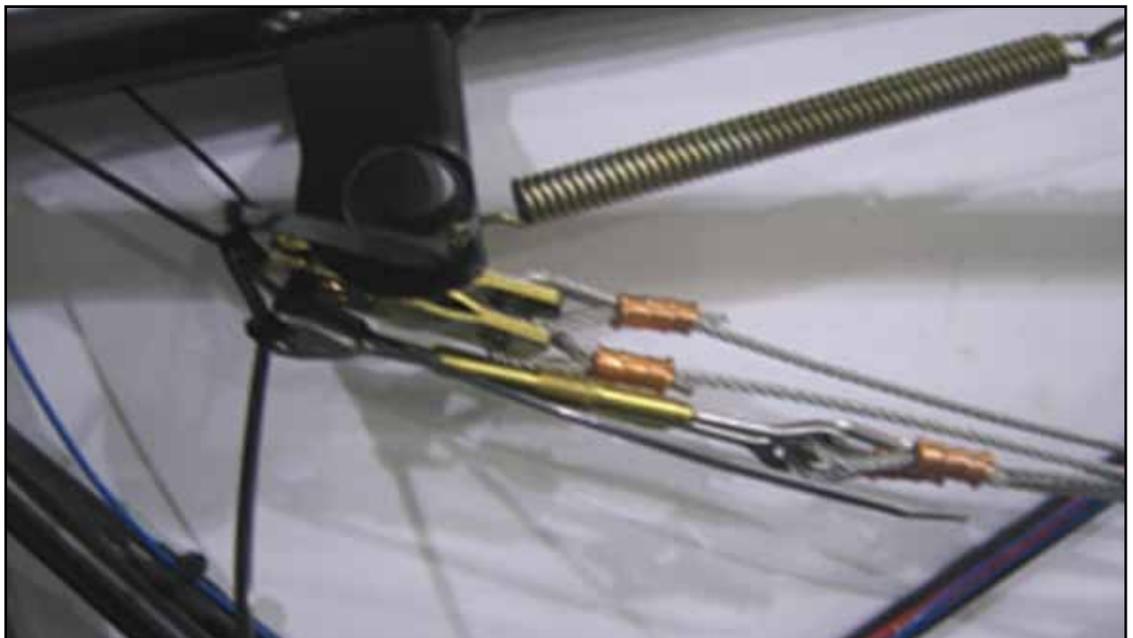
**Photo 289****Photo 290**

Apply anti chafe tape (RM1072-001) to the fuselage tube below the trim motor to protect the top elevator cable.

Remove the rudder from the fuselage.  
Use zip ties to secure the cables to the aft end of fuselage.



**Photo 291**



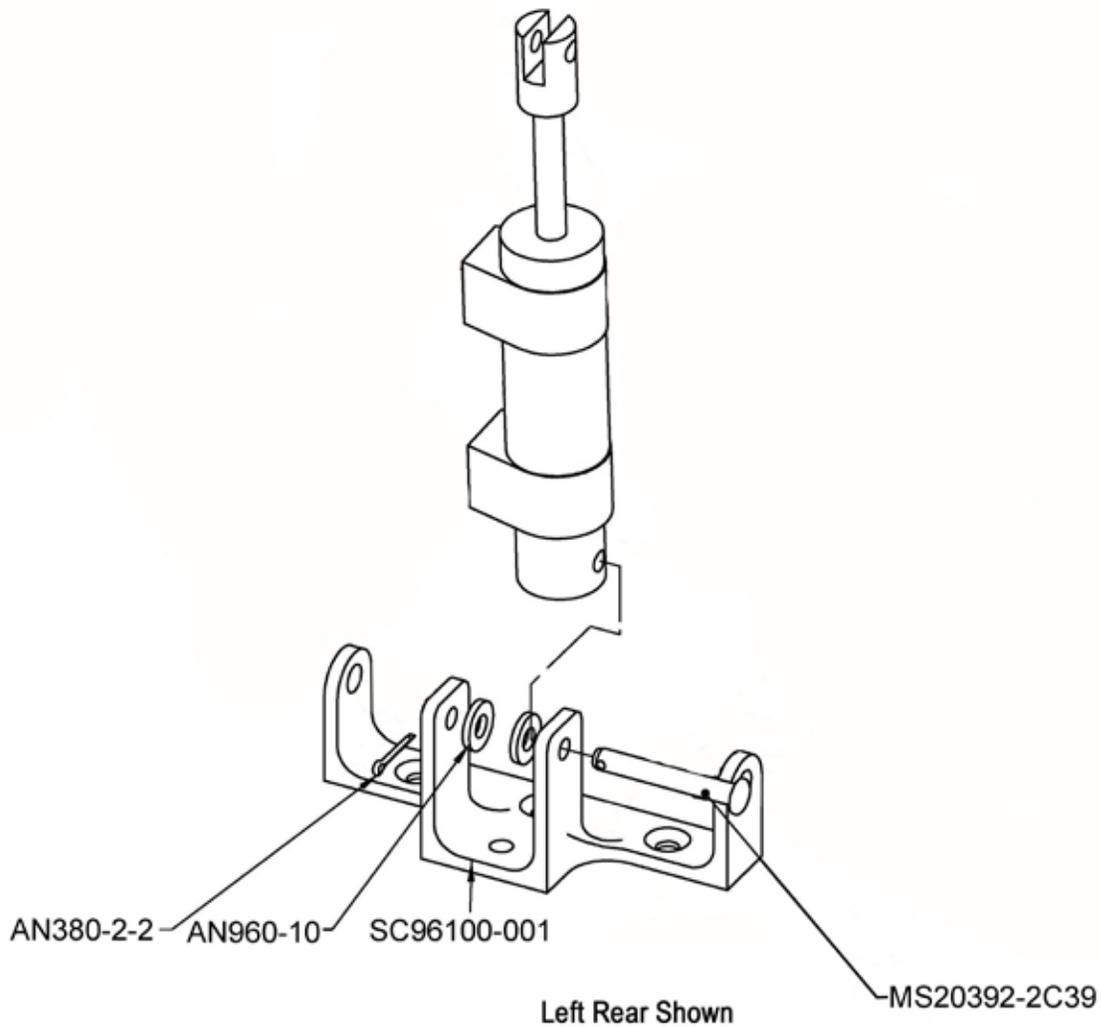
**Photo 292**



*Photo 293*

**SECTION 21**  
**FINALIZE BRAKE PEDALS**

Install the bottom of the two brake cylinders (left and right) to the base of the rudder pedals with fasteners per Figure FS40.



*Figure FS40*

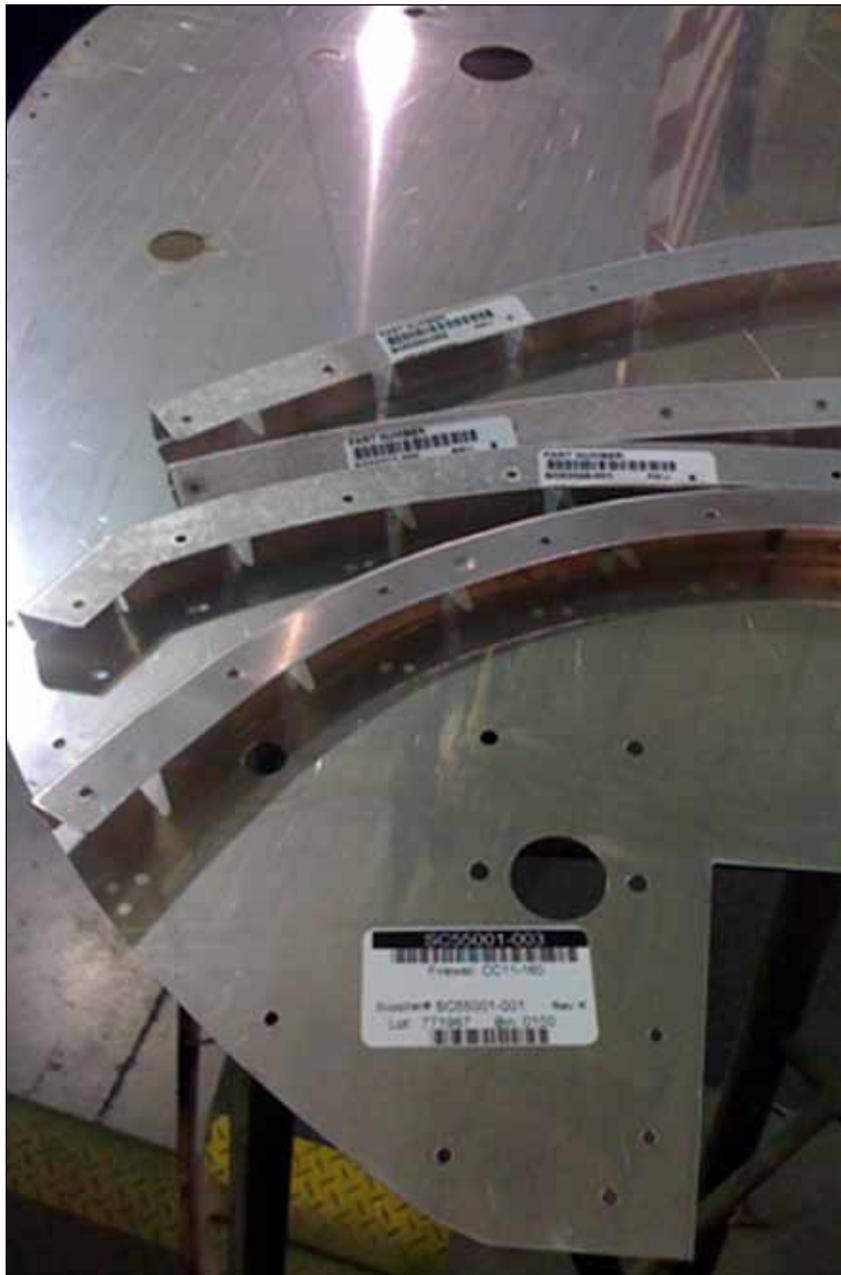
**LOG & INSPECTION SHEET FUSELAGE # 8**

**Inspection point**

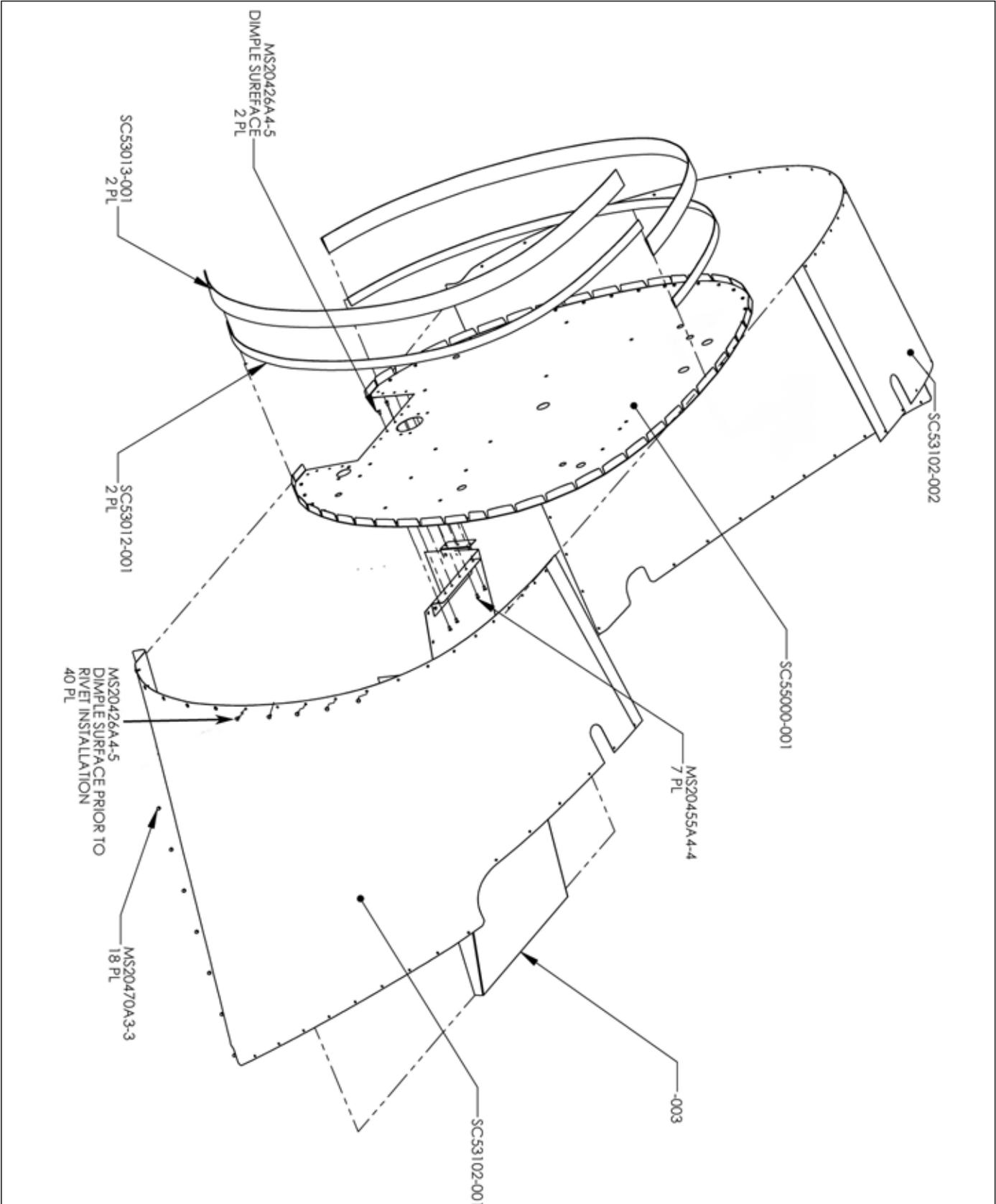
	INSPECTION ITEMS	BUILDER	ALTERNATE
1.40	Elevator cable ends have been properly installed.		
1.41	Ensure cable fairleads are installed and silicone in place.		
1.42	Ensure rudder cables are properly installed.		
1.43	Aft Cargo Compartment: properly secured at upper and lower crossbar.		
1.44	Aft Cargo Compartment sides: top edge will not interfere with fabric installation. Sides are free of burrs and properly secured.		
1.45	ELT antenna: antenna secured with hardware per manufacturers instructions.		
1.46	ELT antenna cable: installed and routed per manufacturers instructions.		

**BOOT COWL BUILD UP INTRO**

This part of the Fuselage Manual is devoted to construction of the boot cowl. Flip back to the cover page and examine the Carbon Cub on the cover of the manual, you will see the engine cowling in yellow. Aft of that, you will see the boot cowl. Aft of that, one per side, you will see the fabric spacers. The parts for the boot cowl are depicted in Figure FS41. Examine the figure and then gather the boot cowl components from your storage area. **NOW IS A GOOD TIME TO REVIEW THE BOOT COWL VIDEO PROVIDED WITH YOUR HARD COPY MANUALS.**



**Photo 294**



**Figure FS41**

**SECTION 22 INSULATION AND VINYL**

The boot cowl begins with cutting out the firewall insulation blanket and the vinyl trim that will show on the cockpit side of the firewall. The insulation and the vinyl are glued together using 3M Hi-Tack 76 Spray adhesive.

Apply an even coat of Hi-Tack to the insulation and the backside of the vinyl. It is good to use a protective paper in the spray area such that you won't end up with a sticky workbench.

Next, using a helper, pick up the vinyl and lay it on the insulation at one side. Using your hands, press and smooth the vinyl from the side you laid down to the side your helper is still holding. Keep smoothing and pressing until the entire surface is bonded. Don't worry if the vinyl is askew a little, there is some room for misalignment.

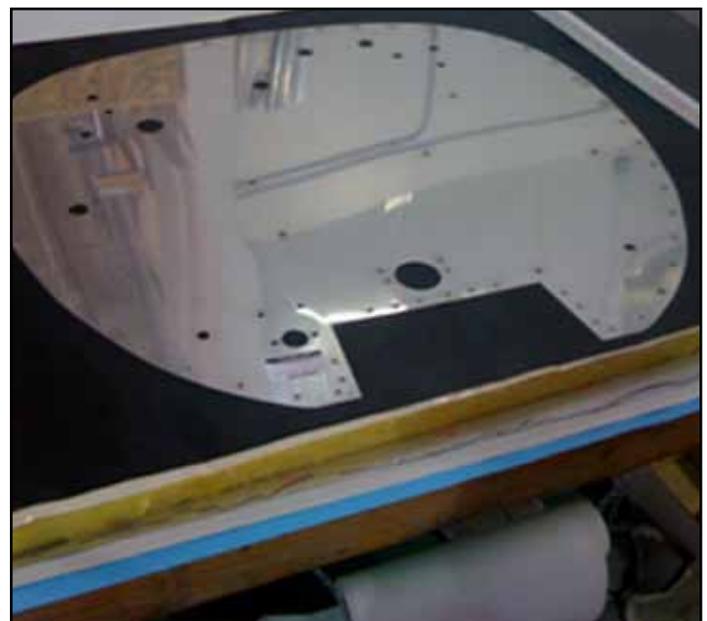
Next, lay the firewall on the vinyl in the orientation shown here. Use a sharp Exacto blade to cut out the 4 engine mount bolt holes. Place ~~1/2~~<sup>7/16"</sup> inch bolts with fender washers (both sides) through the engine mount holes and lightly compress the insulation. Your goal is to have the firewall flat and fixed in one position.



**Photo 296**



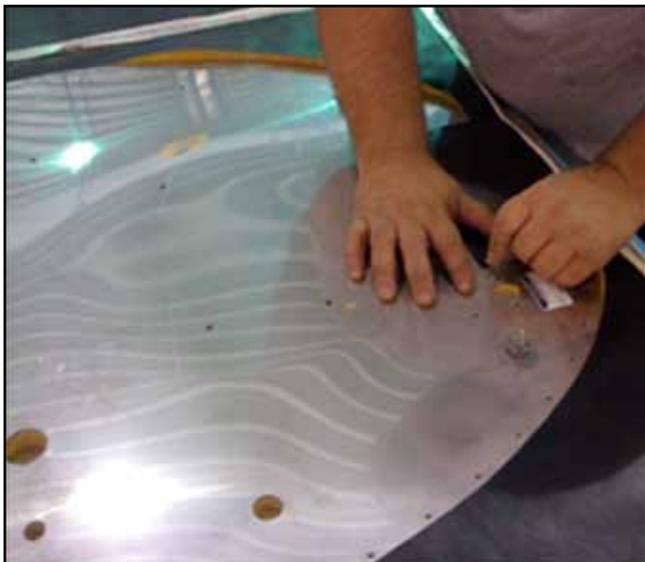
**Photo 295**



**Photo 298**

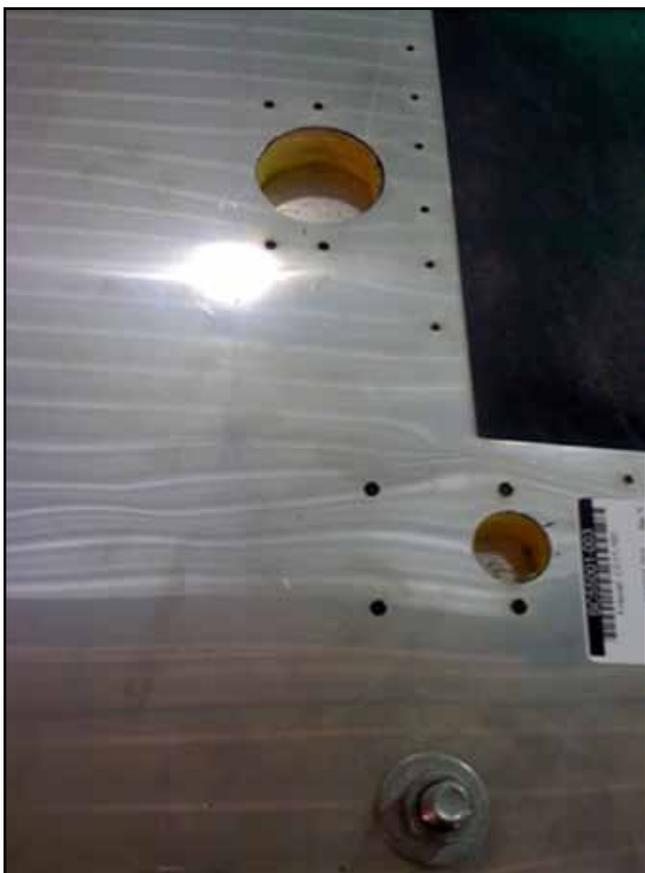


**Photo 297**

**Photo 299**

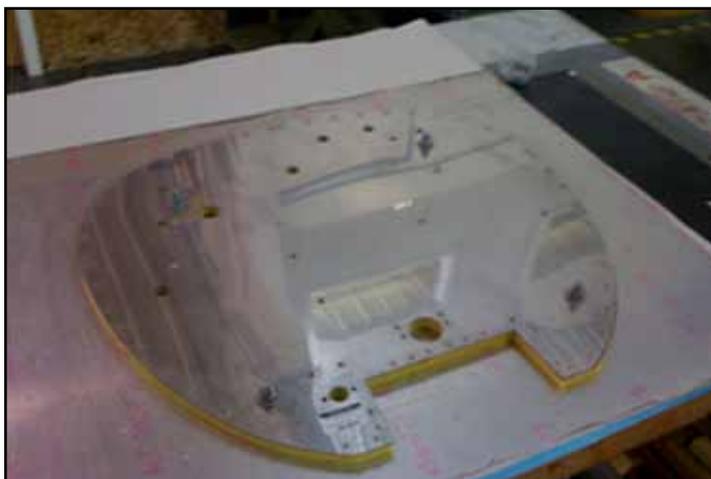
Grab the Exacto knife again and cut out all the large holes in the vinyl and insulation. You do not need to cut out the holes that will receive rivets. Instead, these should be match drilled to the size of the firewall holes. Don't enlarge any holes.

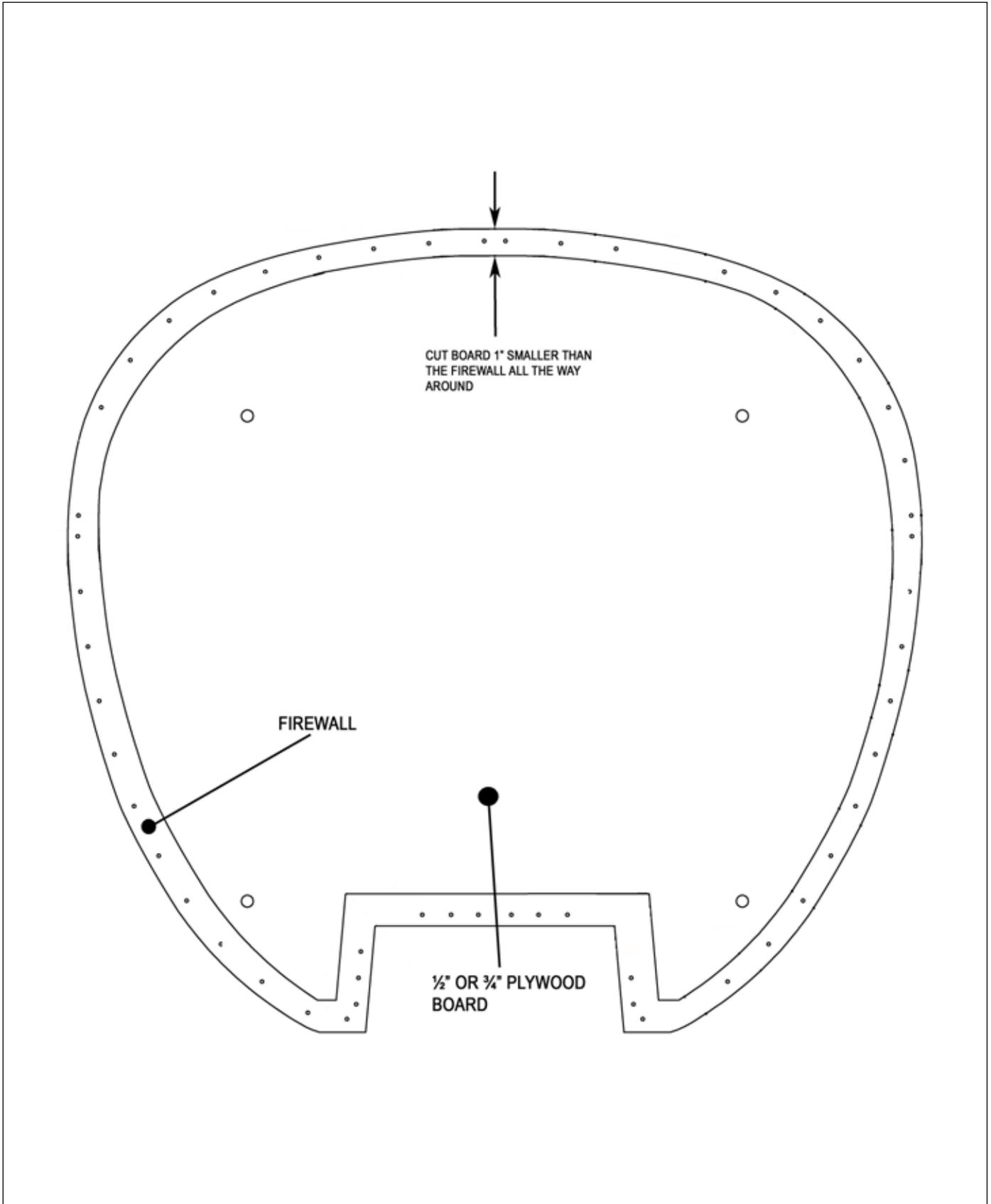
This is the goal appearance.

**Photo 301**

The last part of this step is cutting the periphery of the firewall. Using the Exacto or a razor blade carefully cut around the outside of the firewall. The desired result is depicted here.

Remove the bolts and set the insulated vinyl panel aside. It will be installed after the boot cowl has been painted and you are ready to install the firewall components. Keep the bolts nearby.

**Photo 300**



**Figure FS42**

**Photo 302****Photo 303****Photo 304****SECTION 23 FIREWALL ANGLES**

Using a piece of ½ to ¾-inch plywood or Medium Density Fiberboard (MDF) cut out a firewall stiffener board in accordance with Figure FS42. Use a 1.25-inch reveal around the board. This will allow room for the rivet squeezer.

Using the bolts from the last step, fasten the board to the firewall. Snug the bolts but not so much as to deform the firewall.

Place a pair of spring clamps at the tunnel side of the firewall to keep these “ears” from moving around.

Next, examine the top of the firewall (tunnel is at the bottom). There you will see two pre-drilled holes that are closer together than the others. These are the starting holes for application of the angles. One angle will go left and the other right of these holes.

You should have the SC55001-001 firewall and the 4 angles (SC53004-001, SC53004-002, SC53005-001 and SC5304-002) at the ready. See Figure FS43 for the placement.

Place all the angles into the correct locations per Figure FS43 and note the hole alignments.

Remove all the stickers from the angles.

Using a #30 drill, start at the top of the firewall and match drill the first hole. Fasten the angle to the firewall with a #30 Cleco. Now, skip a hole. Match drill and Cleco the next hole.

Continue this process all the way around the firewall. If there is any concern about the firewall not being flat, feel free to add a clamp to hold the firewall against the board.

Now, you will need to get out your rivet squeezer with dies for MS20455A4-4 universal head rivets. Match drill all the open holes with your #30 bit and then deburr all the holes.

The factory head of the rivet will be placed to the cockpit side of the firewall. Your goal is to squeeze the rivet to have the shop head be  $\frac{1}{2}$  diameter high and 1.5 diameters wide. Set the length of the dies in the squeezer to achieve this. Under-setting the head, adjusting the squeezer and squeezing again is an OK way to sneak up on the right setting.

Rivet all the open holes. Remove the Clecos, deburr and rivet all the remaining holes. You should end up with some fine shop heads like those shown below. Photo 308 shows one of the stations between angles.



**Photo 305**



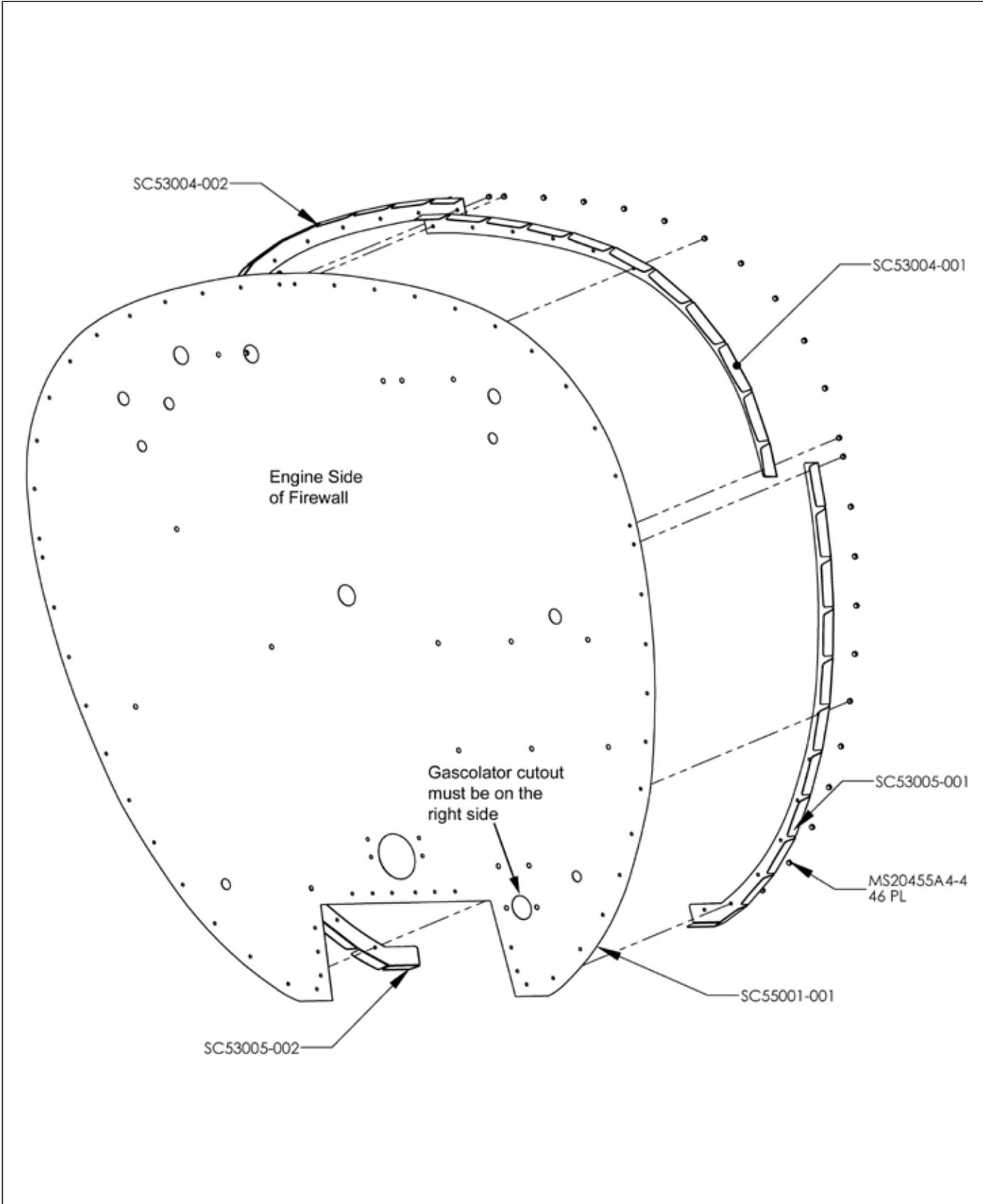
**Photo 306**



**Photo 307**



**Photo 308**



**Figure FS43**

## SECTION 24 TUNNEL ANGLES

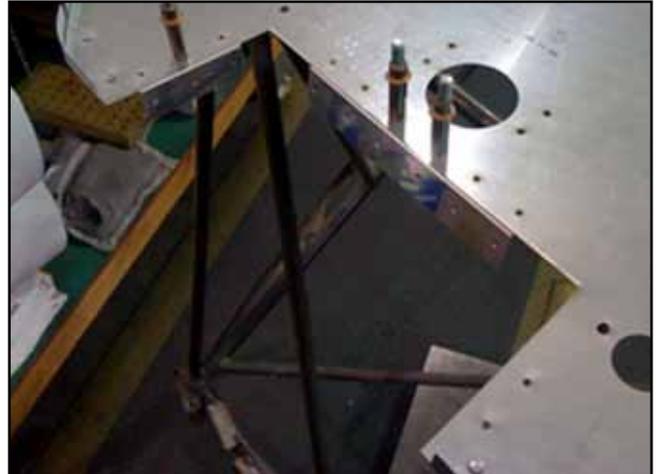
Gather the tunnel parts (tunnel and 2 angle pieces) in accordance with Figure FS44.

Begin by fastening the side angle and top angle with Clecos. Place the 2 Clecos in the top angle as shown. These holes are flush riveted while the others use universal head rivets.

Next, match drill the two open holes in the side angle and the 4 open holes in the top angle. Deburr the holes. Rivet these 6 positions with MS20455A4-4 rivets. The heads are in the same orientation as for the 4 angle pieces.

Remove the 3 Clecos. Match drill and deburr the holes. Rivet the 3rd rivet in the side angle. Using another rivet squeezer (or change the dies in the one you already have), dimple the two center holes in the top angle. Clean the hole with a #30 drill bit and deburr. Then rivet these two holes using MS20470A4-4 flush rivets.

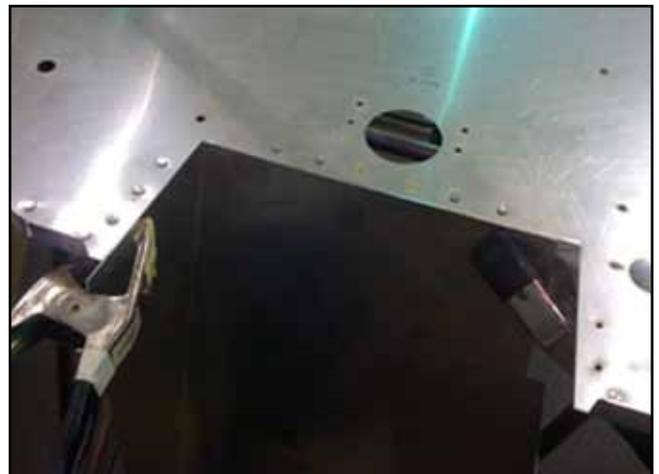
The result of this work should be as in Photo 311.



**Photo 309**



**Photo 310**



**Photo 311**

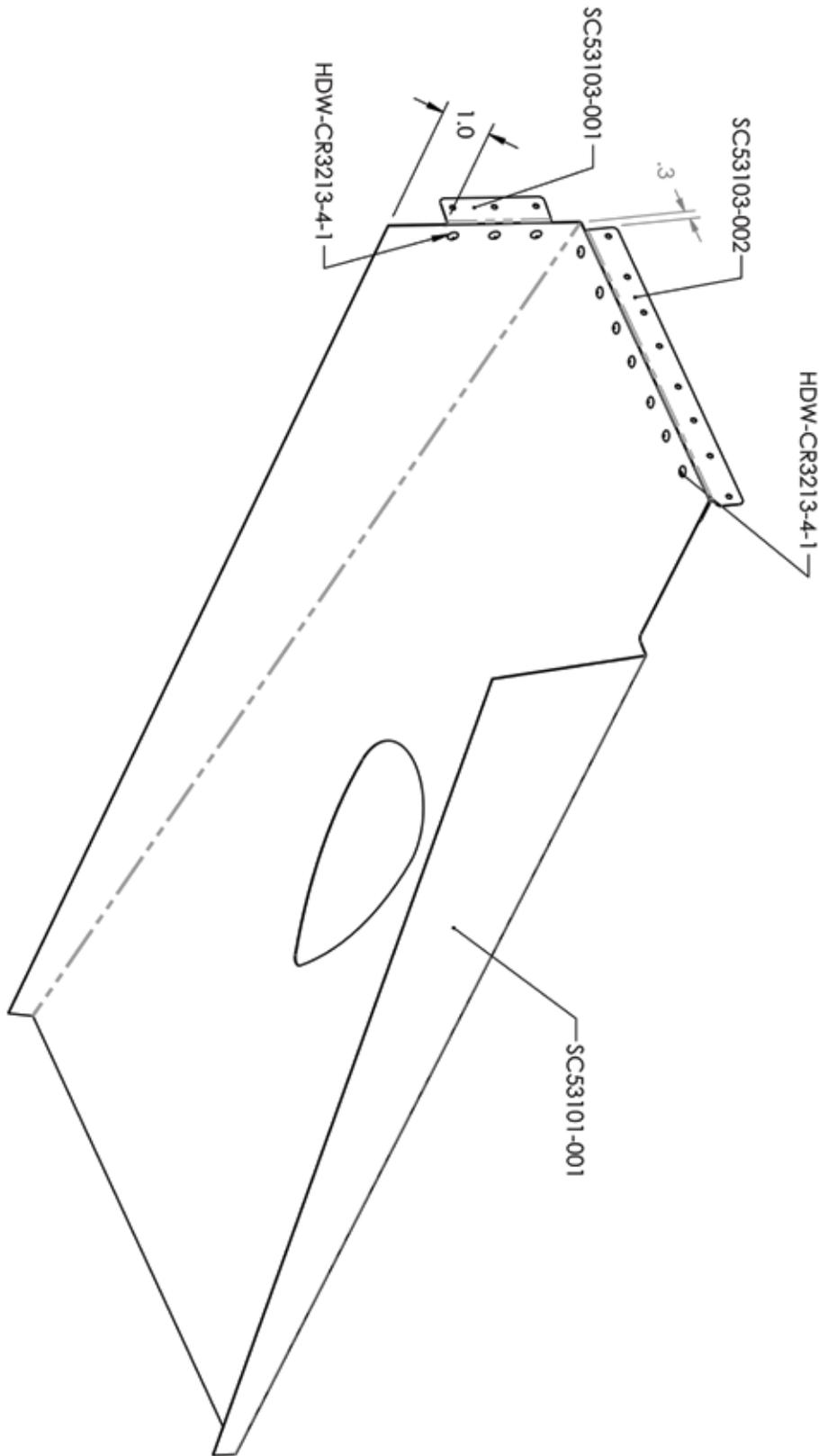
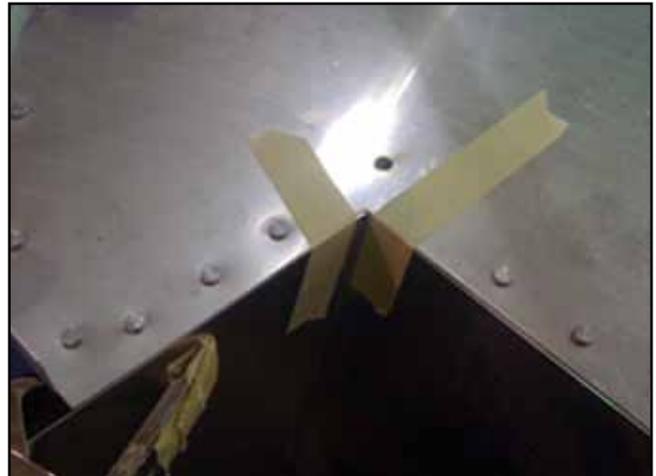


Figure FS44

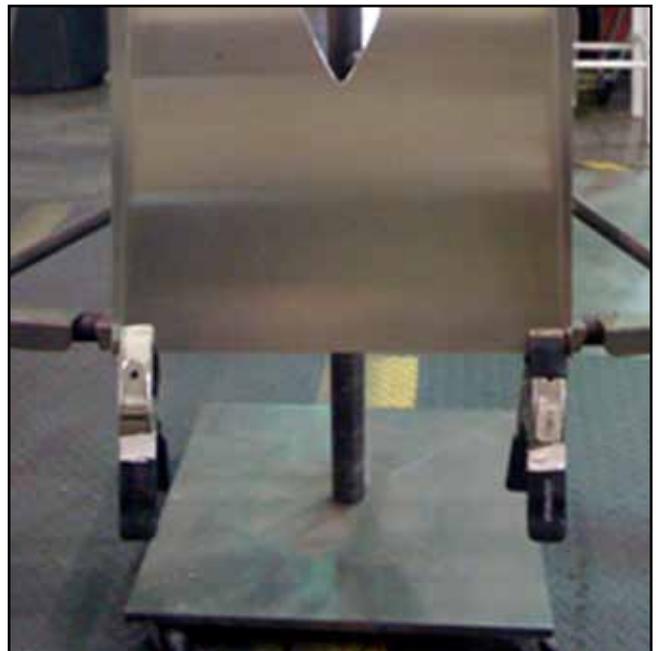
## SECTION 25 TUNNEL

The next step addresses fastening the tunnel to the angles just placed. Begin by using spring clamps and tape to hold the tunnel in place. You want the side and top intersection lines to be parallel.



**Photo 312**

The tunnel should hang such that it is centered on the fuselage. Now, most of you will say – What do you mean hang? I can't hang it from my full size fuselage!! Well, the boys at CubCrafters do this on a fuselage jig. There it hangs. The video shows the boot cowl being built on the fuselage, this allows you to see it from two different angles. Everything in the manual will show the boot cowl being built on our fixture, which is like having your fuselage standing on it's tail. In your case, you will fit it on your fuselage, make sure it is square with the center of the fuselage. Align the tunnel as in the Photo 312 and move on.



**Photo 313**

Now, using a #30 bit, match drill the middle side angle hole and the middle two top angle holes (as when the angles were first placed). Place Clecos in those 3 holes. Match drill the remaining holes and deburr. Install CherryMax rivets HDW-CR3213-4-1 per Figure FS44. The factory head should be in the tunnel as shown in Photo 314. Remove the 3 Clecos, match drill, deburr and rivet the remaining holes.



**Photo 314**

**Photo 315****SECTION 26 INSTRUMENT PANEL**

The instrument panel on the CubCrafters boot cowl jig is welded into place.

If you examine Figure FS45 you can discern the desired location in principle. The 3" dimension in Figure FS45 corresponds to a dimension of approximately 3 inches as shown on the photograph to the left (3 inches from face of panel to intersection with the A pillar).

However, the location is not precisely fixed by reference to the fuselage tubing. It is actually fixed by reference to the boot cowl.

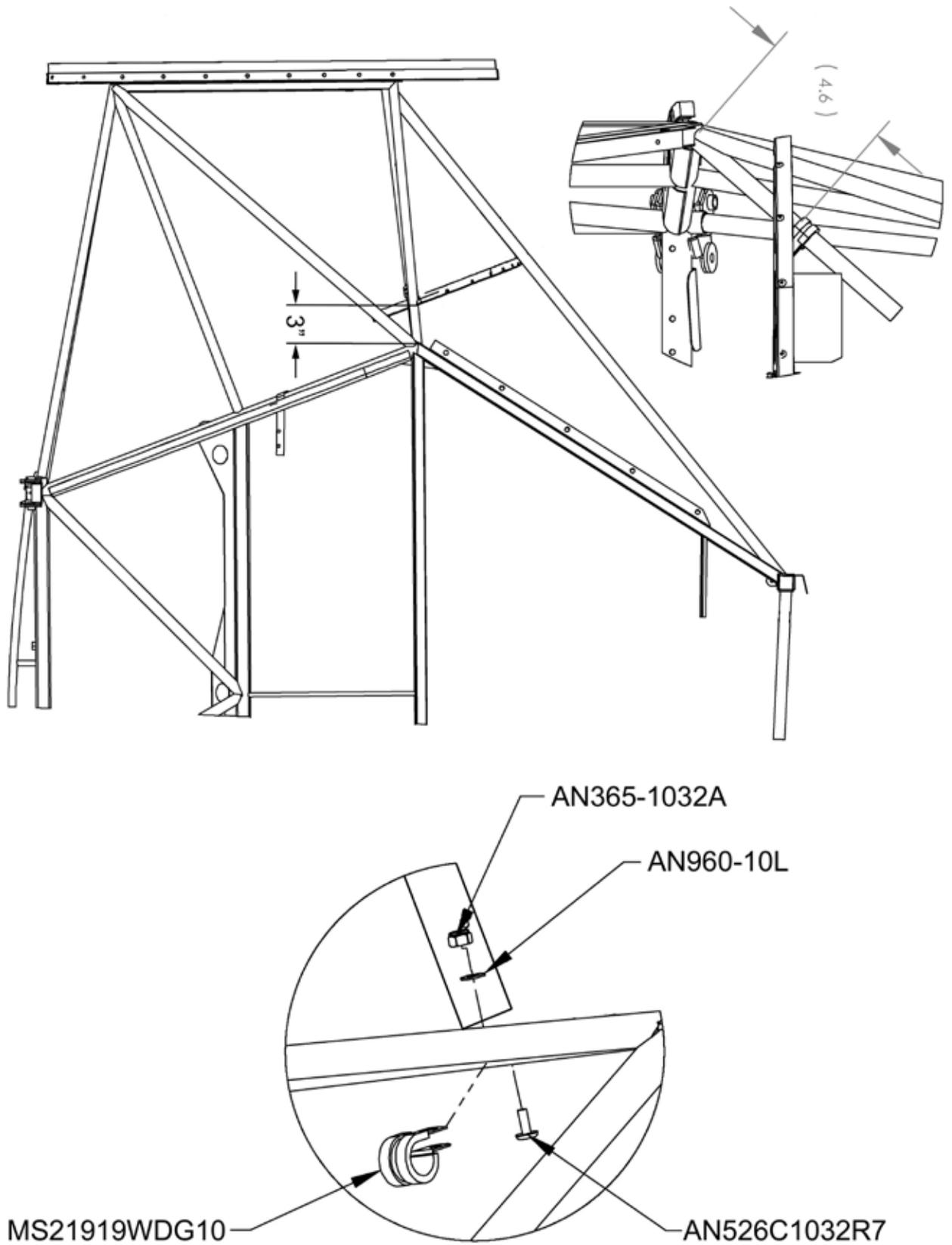
So, measure 3 inches (as shown in Figure FS45) and put a piece of masking tape on the left diagonal and another piece of tape at the same relative location on the right diagonal.

Now place your empty (no instruments) panel so that the face is at the 3-inch marks. Tip the panel forward against the V-brace and tape the panel to the V-brace.

Now, gather 2 #10 Adell clamps, 2 AN526C1032R7 screws, 2 AN960-10L washers and 2 AN365-1032A Nylon lock nuts. Position the Adell clamps as depicted in Figure FS45 on the diagonal braces. These Adell clamps will allow the position of the panel to be adjusted slightly. With the panel on the tape marks, mark the lower flange of the panel for the Adell clamps. Drill the panel with a #12 bit and attach the Adell clamps to the panel with the fasteners.

Don't worry about the tip angle of the panel. It will be adjusted to match the boot cowl. Simply keep the tape in place to avoid having the instrument panel moving inadvertently.

Once your panel is in position, leave it there until the boot cowl is fitted in finished.



**Figure FS45**

**Photo 316****SECTION 27      SIDE PANELS**

Make sure the firewall stays up against the board on the front of the fire wall during the rest of your boot cowl build.

Next, go to your parts storage area and select the 2 boot cowl side panels.

Next, gather all the spring clamps you can get your hands on. At CubCrafters "Boot Cowl Bill" uses approximately 60 clamps in this step. All the clamps in the photograph to the right will be used.

**Photo 317**

Start by clamping the left side boot cowl side panel near the bottom at the tunnel and the firewall angle piece.

Now, slowly and methodically, move around the periphery of the firewall clamping the boot cowl side panel in place. Your goal is to have the side panel: 1) concentric to the periphery of the firewall; 2) parallel to the line of the angle piece tabs; and 3) laying against the fabric spacer nicely.

Once you get to the top, we will slide the instrument panel under the side panel and align the mating lines. This means that you may have to slide the panel forward or aft a bit and then correct the "tip" of the instrument panel to match the boot cowl. The movement distance should be quite small.

**Photo 318**

Here is an in-progress photograph as the side panel is conformed to the firewall. Notice how the side panel and the tabs on the angle pieces are aligned.

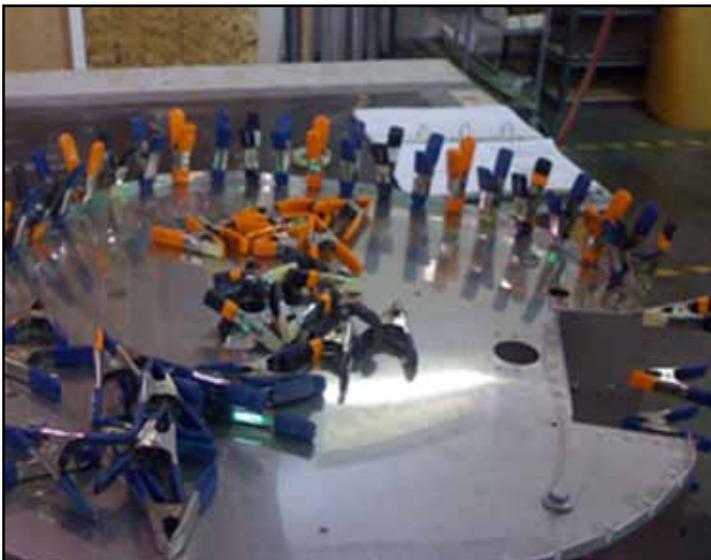
Keep checking the fit and the lay-up of the side panel against the cheek cowl. Don't be afraid to go back and adjust if things start running off. Even "Boot Cowl Bill" (who has built many, many boot cowls) needs some time to get this straight. Your patience will be rewarded with a nice fit.



**Photo 319**

At this point one side is in position and it is time to clamp the second side to the tunnel.

In the video we wait until the end to drill the sides of the tunnel, but it will not matter if you drill and cleco it now. Clamp and match drill the holes with a #40 bit between the tunnel and the side panel. It is likely that the edge of the tunnel and the edge of the boot cowl will be off by 1/8 to 1/4 inch. This will be trimmed in a later step.



**Photo 320**



**Photo 321**

**Photo 322**

Place Clecos in every other hole.  
Now, much as you expected, repeat the entire fitting process for the second side panel.  
Just like the other side, start at the tunnel end of the panel and work your way around.

**Photo 323****Photo 324**

Continue the clamping to include the second side of the tunnel.



**Photo 325**

60 clamps is a load of clamps but it works best to use them. Avoid trying to accomplish this step without having a lot of clamps. It is very important to keep the parts in close alignment.



**Photo 326**

**Photo 327**

Now it is time for some visual verification that everything is in order.

Begin by checking the gaps between the V-brace and the cowling side panels. The reveal to the left and right of each V-brace should be approximately the same.

**Photo 328**

Next check the overlap of the two side panels at the top of the firewall. There should not be any significant misalignment of the panels.

**Photo 329**

The center seam between the two panels should be on the fuselage mid-line. If everything checks out, put a piece of tape over the fore-aft seam to hold its position.

Take another piece of tape and tape the "belt line" while pulling a bit of tension from left to right. Then take another piece of tape and pull the tension from right to left.

It is now time to begin fastening the side panels to the firewall.

Begin by dimpling the first rivet position to the right and left of the tunnel. The outside of the cowling should be the flush side.



**Photo 330**

Clean the hole if necessary by re-drilling with a #30 bit.



**Photo 331**

Using a rivet squeezer, place a MS20426A4-5 flush rivet in each of the two holes.



**Photo 332**

**Photo 333****Photo 334****Photo 336**

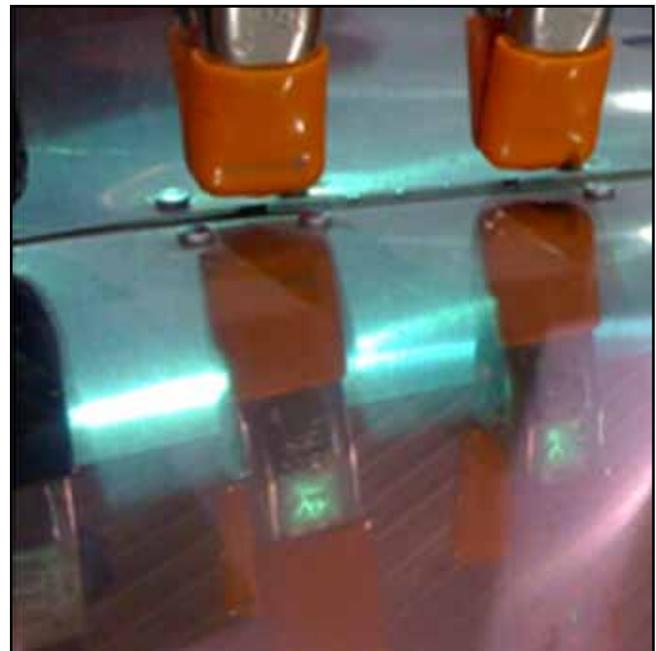
Now, go get the boot cowl shims (2 each SC53013-001 wide shims and 2 each SC53012-001 narrow shims). These shims have a different radius of curvature on each end. Take one of each shim and position them so that the two shims align on the outer edge.

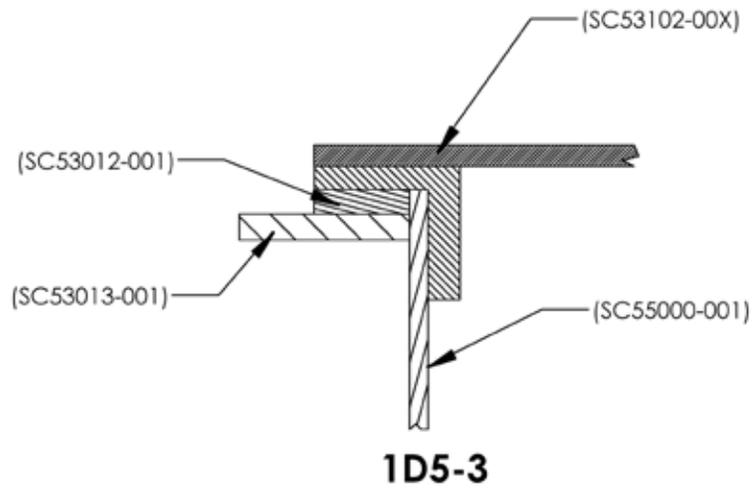
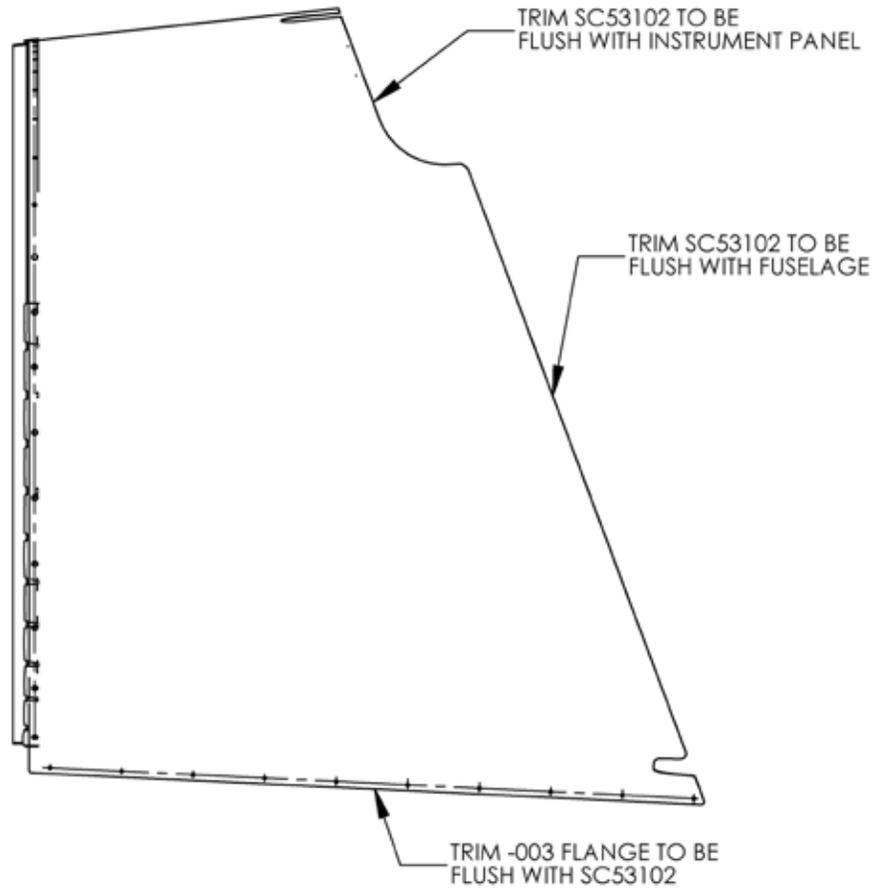
Now examine the lower portion of Figure FS46 to see the proper positioning of the shims. By keeping the shims, firewall and angle piece tabs aligned, the flatness of the firewall is established and maintained. Think about that for a minute. We're going to install shims and then hold everything in line with those shims. The line is curved and that curve will prescribe a planar surface. That plane is the firewall.

Remove the clamps from half the periphery.

Position the shims so that the more-curved end of the shims is at the top of the cowl. Install (just slide it in) the small shim starting at the bend just outside of the tunnel Photo 333. Install (again – just slide it in) the large shim starting at the top of the cowl center.

Start at the top and work around the cowl aligning the two shims to the angle piece tabs while keeping the gap small and as-close to uniform as you can.

**Photo 335**



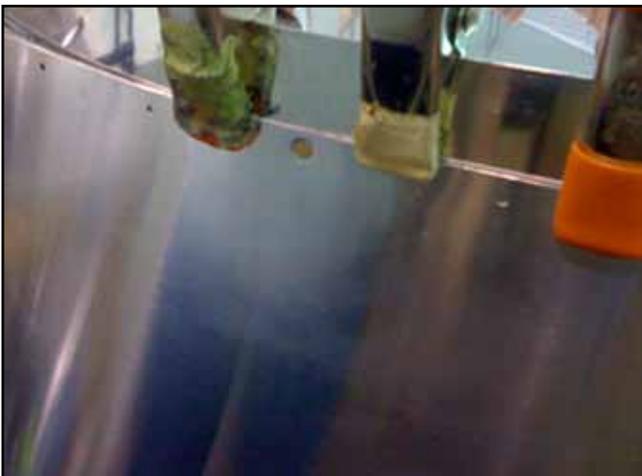
**Figure FS46**

**Photo 337**

Here is a progress photograph showing the need for a little “pull-up” of the shim. The “pull-up” can be accomplished with needle nose pliers.

**Photo 338**

The riveting begins at the 7th rivet from the bottom as indicated by the finger in the photograph to the right. As always, match drill the hole in the side panel, deburr, and then dimple. You will have to change your dimple thickness from the last dimpling as there are now several more sheets involved. If necessary, clean the dimpled hole with a quick pass of your #30 bit.

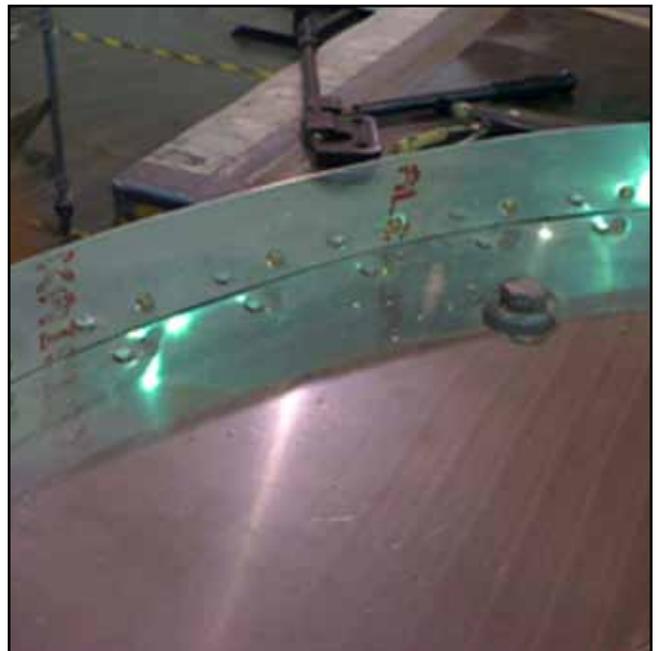
**Photo 339**

Place a MS20426A4-5 rivet and squeeze it to specification (shop head is ½ thick by 1.5 wide, etc.).

Now, continue the riveting around the first half of the boot cowl. Be very careful to keep everything in line. There is no adjustment of position once the sheets are dimpled-together.

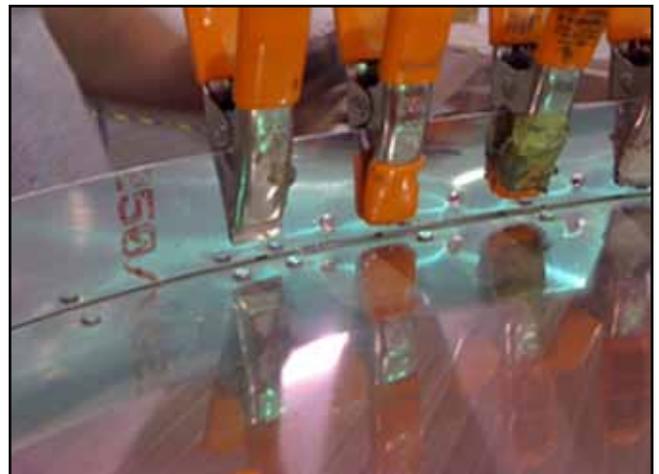
**Photo 340**

In this photograph you can see finished rivets and a nice, consistent gap between the wide shim and the firewall. This firewall will be flat.

**Photo 341**

In this photograph, the gap is not perfect but still within the acceptable range.

It would be nice if everything stayed as tight as this position but it is not likely. There will be small variations in the gap, as depicted.

**Photo 342**

**Photo 343**

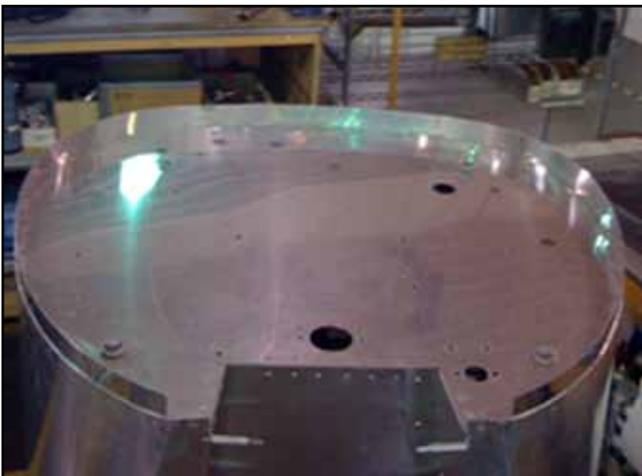
Before we continue to the second side it is necessary to trim the small shim. Trim it back to the first notch as shown in Photo 343.

Now go after the second side. Remain patient and persistent. Your steadfast approach will be rewarded with a great looking boot cowl.

**Photo 344**

Remember when it was said that the tunnel and the boot cowl side panels might not align perfectly. It was mention of a possible 1/8 to 1/4 inch of misalignment. The photograph to the right shows this misalignment with a red trim line. Mark the trim line on both sides of the tunnel. Use a cutoff tool in a die grinder to remove the extra material from both sides. Then use a file or rotary sander to smooth the cut lines.

Now, in the same manner as for the first tunnel side, finish riveting the tunnel second side. Don't rivet the hatch cover.

**Photo 345**

The boot cowl should still be in good position on the V-braces. Check the alignment. A bit of variation as depicted here is OK.



**Photo 347**

**SECTION 28 BOOT COWL HATCH**

Next, we will install the boot cowl hatch. This hatch allows access to the Gascolator from the tunnel. Begin by clamping the hatch into position. It is helpful to use a straight edge to line up the hatch fold with the tunnel fold.

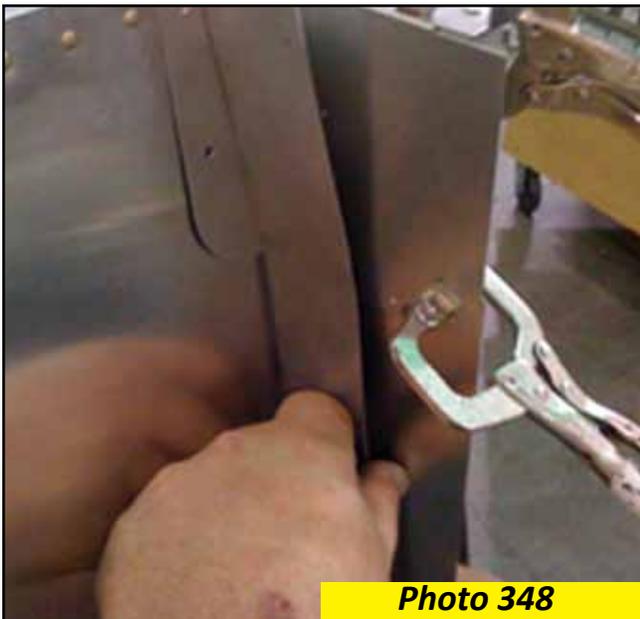
Match drill the rearward holes through the hatch into the tunnel with a #30 bit. Place a Cleco in both holes.

Match drill the holes into the tunnel bottom. Place a Cleco in the forward hole.

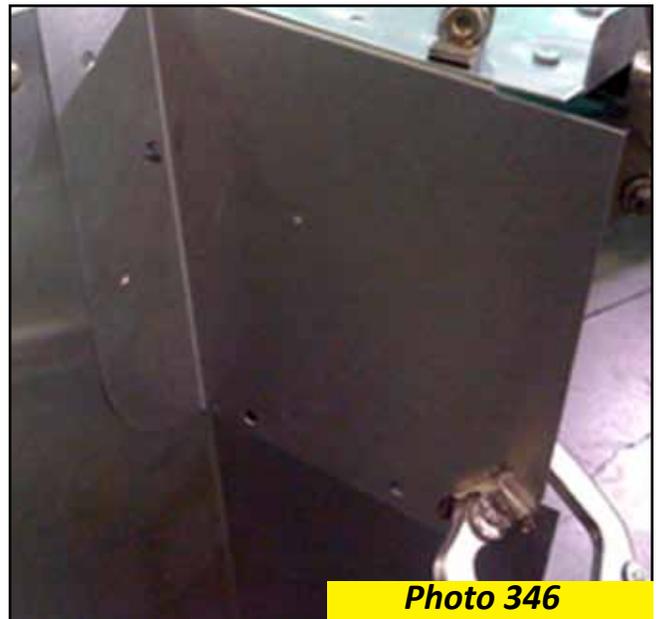
Match drill the two side holes with a #40 bit and place Clecos.

Match drill the 2 holes in the firewall.

Remove all the Clecos. Deburr all the holes.



**Photo 348**

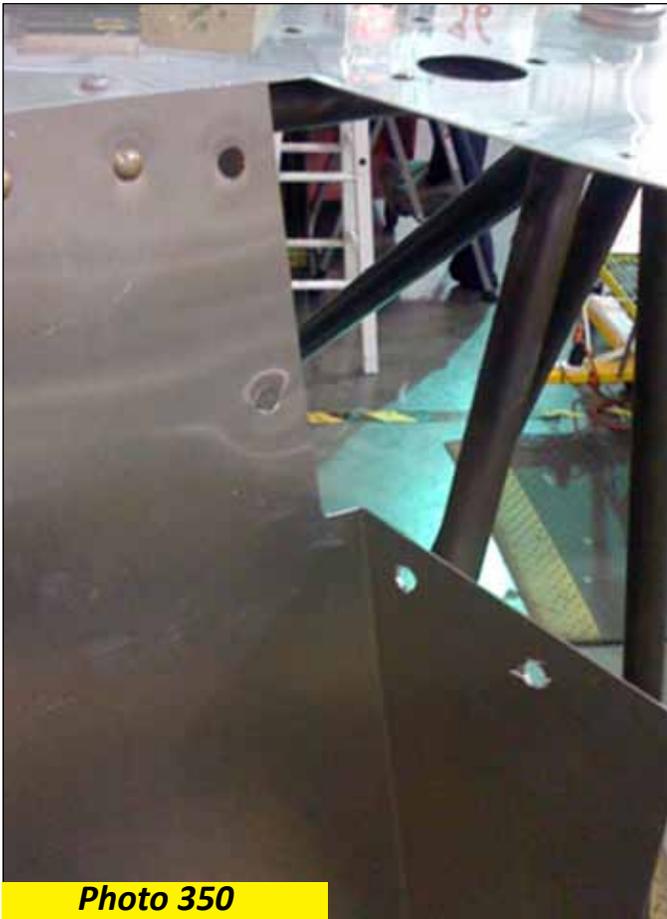


**Photo 346**

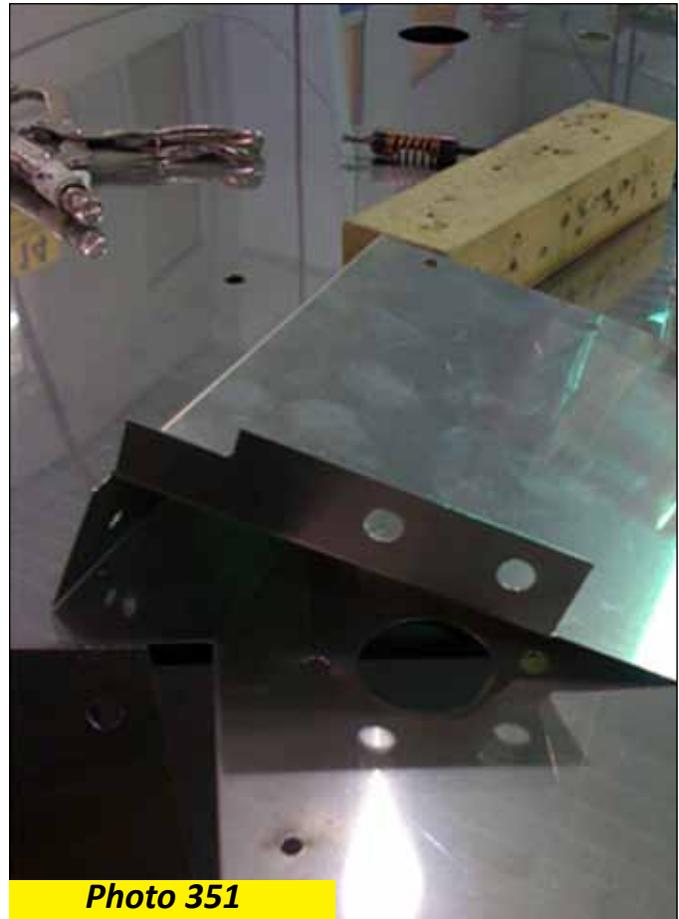


**Photo 349**

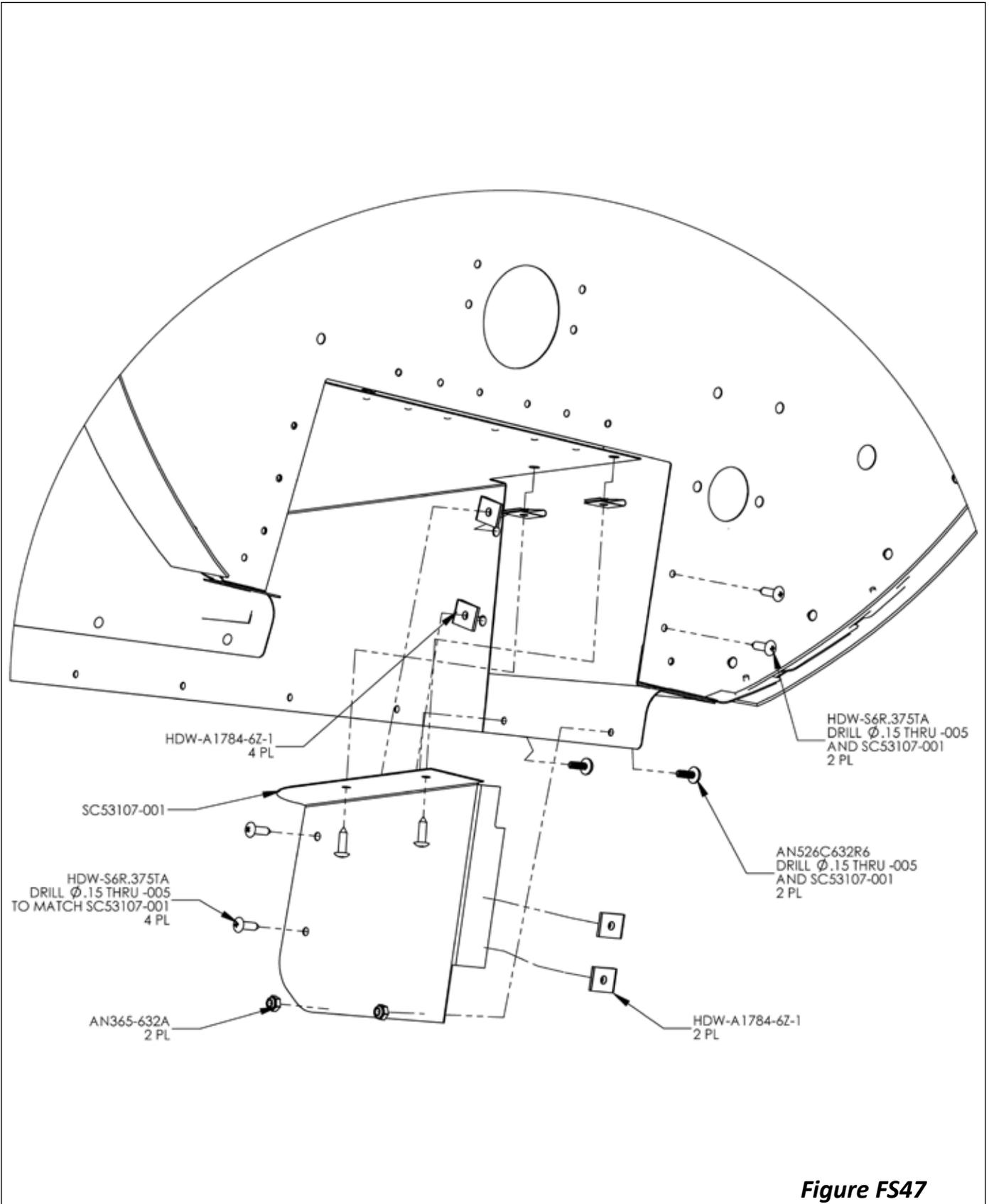
Drill all the places that the Tinnerman nuts will be placed to ¼ inch. See Figure FS47 for the locations.



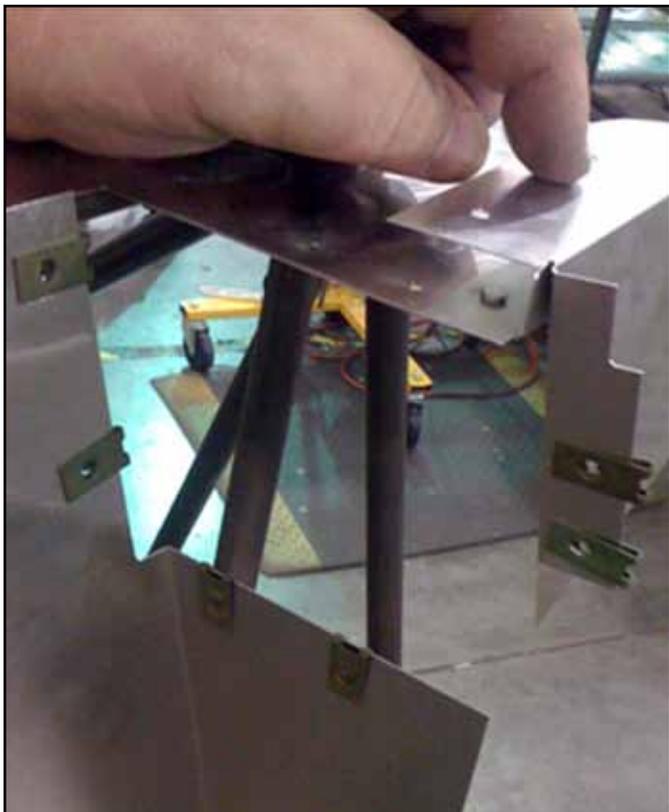
**Photo 350**



**Photo 351**



**Figure FS47**

**Photo 352**

Place Tinnerman nuts on the 6 locations shown here.

This is the hatch.

Place the screws in the 6 Tinnerman nut holes. Start the screws in all the holes before tightening any of them.

Mark and trim the hatch to match the leading edge of the tunnel.

Fasten the screws (snug is enough for now).

**Photo 353**

Now it is time for a bit of trimming. Trim the corner of the tunnel to boot cowl intersection.

Next, correct the taper of the panel intersections by cutting "to zero". Cut width. Cut zero.

Repeat the taper correction again here.

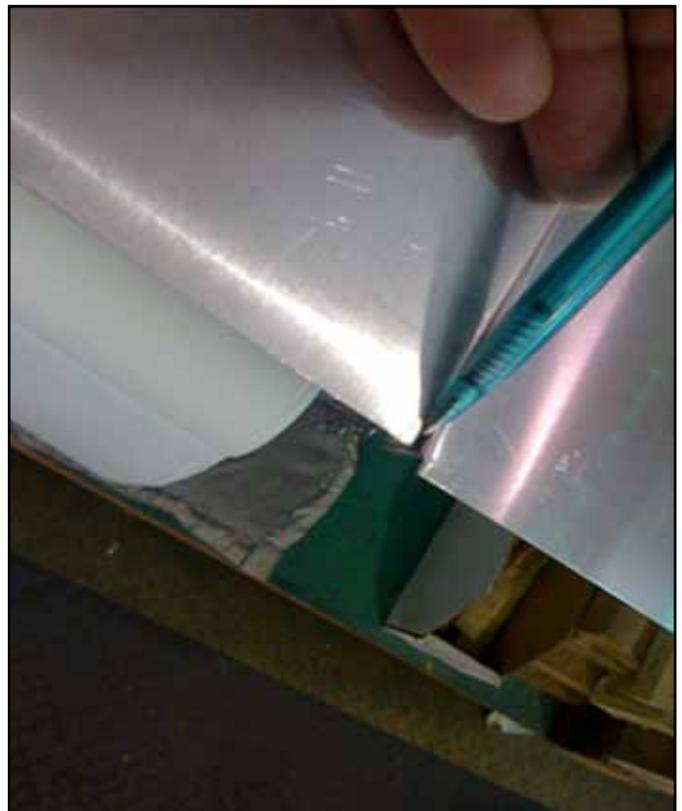
Lastly, before handling the boot cowl for the next steps, apply a spring-clamp Cleco to the overlap joint on the top of the cowl. This should prevent the joint from "scissoring" and possibly kinking the firewall face.



**Photo 354**



**Photo 355**



**Photo 356**

**SECTION 29 SEAL AND PRIME**

Now, apply a nice bead of firewall RTV sealant around the entire inner seam of the firewall to side panel junction.

Now, it is time to prime the boot cowl. Apply primer to the outside surfaces.



*Photo 357*

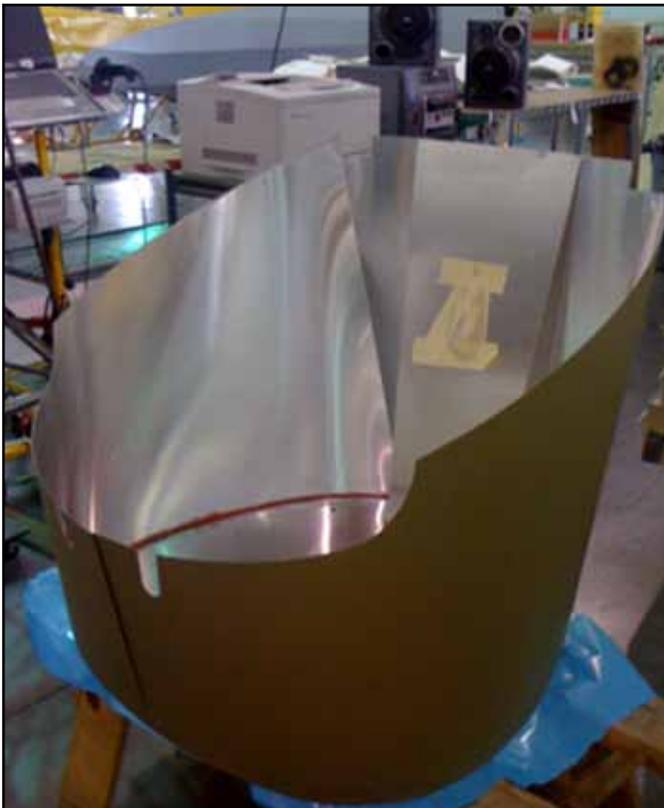
**SECTION 30 FIREWALL INSULATION (AFTER PAINT)**

Once the final paint is completed, setup a workstation as depicted below. You will want some low sawhorses or their equivalent (about 18 inches high), your firewall stiffener board and some protective paper. The protective paper is necessary because we're shooting spray glue again in the next step.

*Photo 358**Photo 359*

Set the boot cowl on the firewall stiffener board as shown below left.

Next, you will need four alignment rods like those shown here. These can be made from any ½-inch stock and can be welded or bolted to the plates. You can see their use on the next page.

*Photo 360**Photo 361*

**Photo 362**

Next, apply a nice even coat of 3M Hy-Tack 76 Spray Adhesive to the insulation side of the firewall insulation/vinyl.

Repeat the Hy-Tack application by spraying a coat on the firewall surface of the boot cowl. Avoid spraying the side panels. Remove the excess with solvent if necessary.

**Photo 363**

Now, place the locating rods through the engine mount bolt holes as in the Photo 364.

With assistance (4 hands are most effective), lower the insulation/vinyl onto the rods and then press into place on the firewall. If everything is in order the fit should be perfect.

**Photo 364****Photo 365**

## SECTION 31 GROMMETS

Now, gather the grommets that go through the firewall in accordance with Figure FS48.

Install all of the grommets from the firewall side. A splash of denatured alcohol will help temporarily lubricate the grommets while installing.

After the grommets are through the firewall, go to the backside and push the vinyl under the grommets as shown below. This isn't a fun process but it can be done with a selection of smooth "pusher tools". You can skip the #2 grommet for the oil pressure line, as it is too small to get the vinyl under effectively. Brush away the insulation remnants.



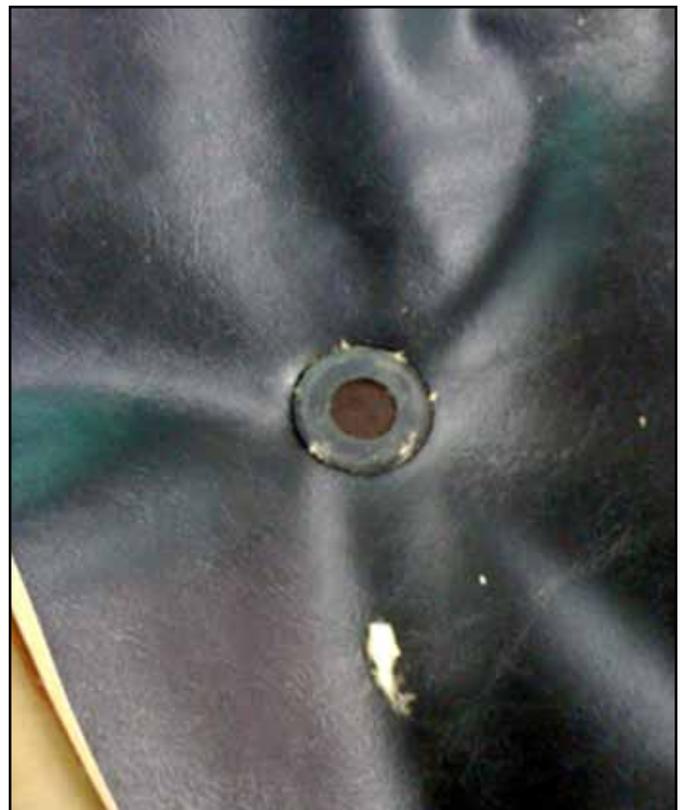
**Photo 366**



**Photo 367**



**Photo 369**



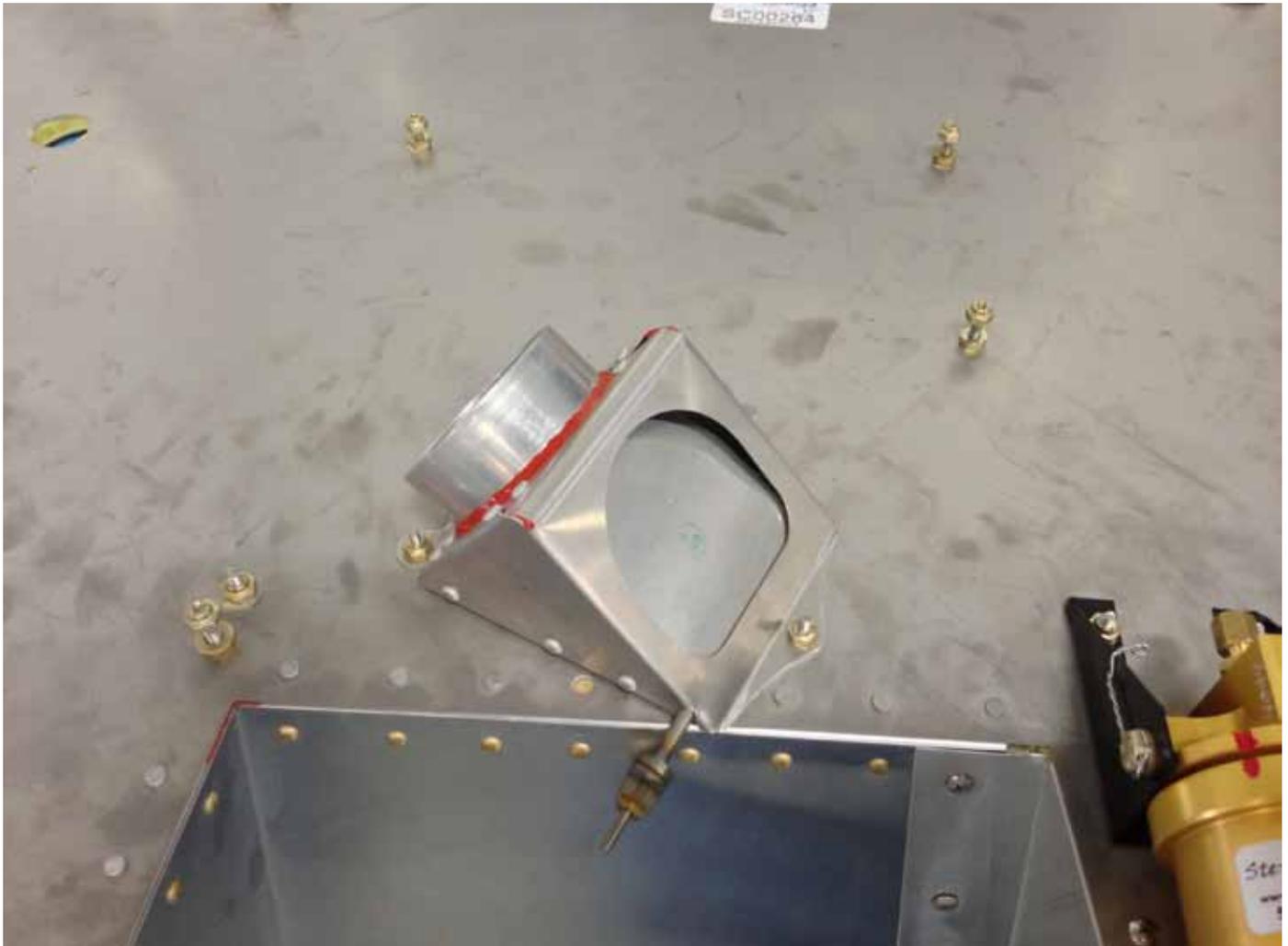
**Photo 368**



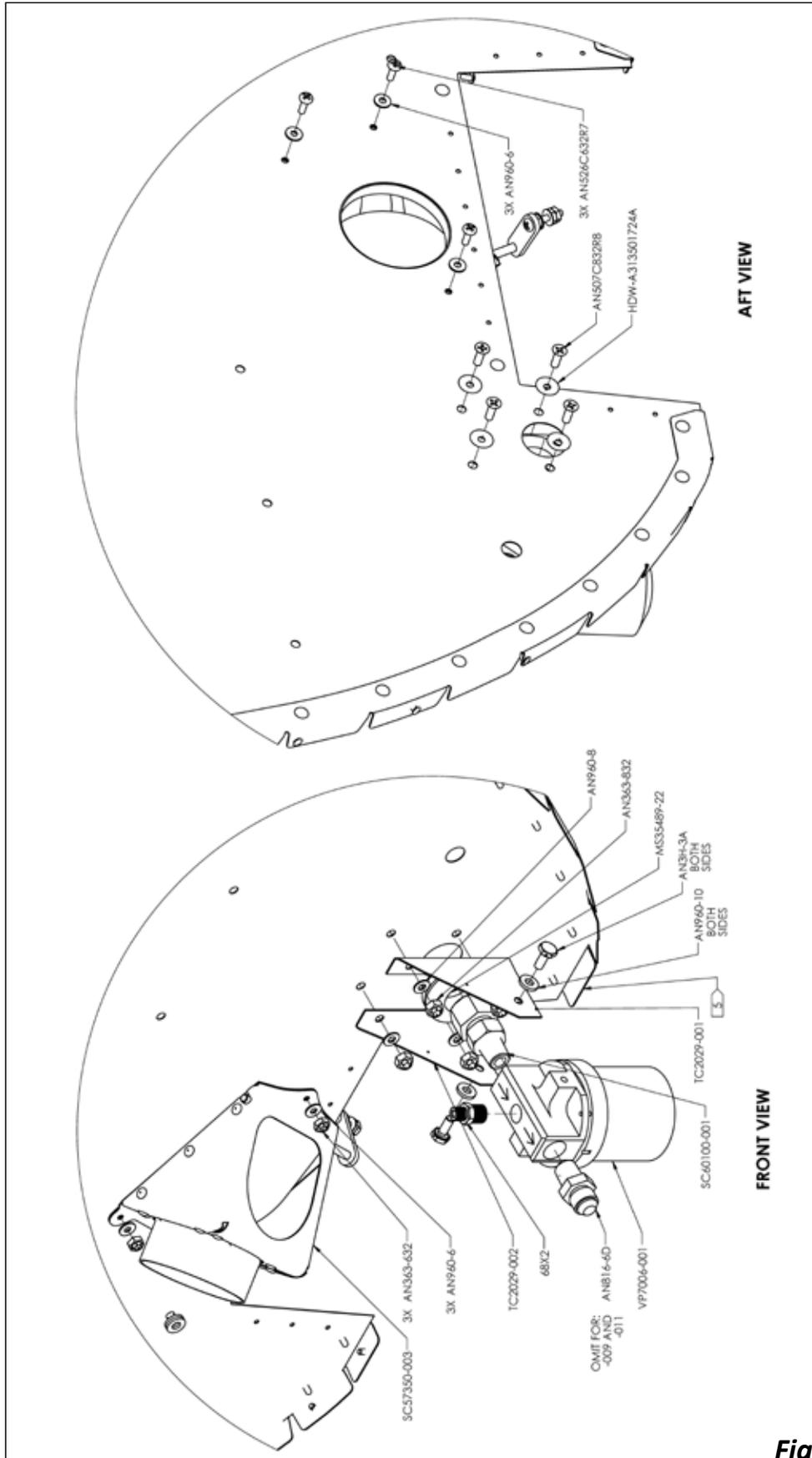
**SECTION 32 HEATER AIR BOX**

Next we will install the heater air box to the firewall in accordance with Figure FS49.

The installed air box should look like this.



**Photo 370**



**Figure FS49**

The following Steps deal with installation of optional components (not supplied in the base kit but available from CubCrafters).

### SECTION 33      GASCOLATOR

The installation of the Gascolator is next. Much like the air box, select the components from Figure FS49 and install in accordance with normal aircraft shop practices.

The resulting installation will look like this.

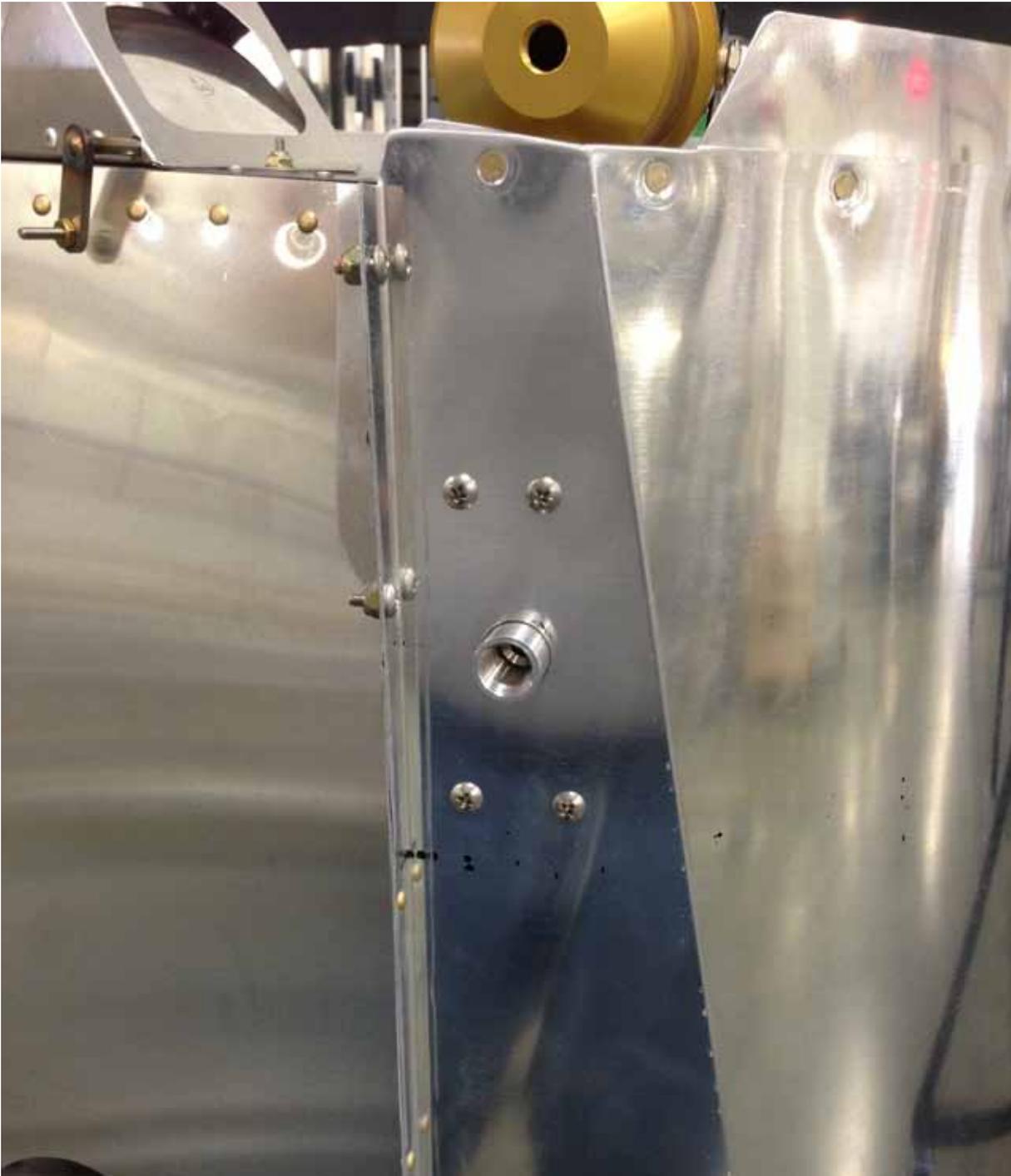


**Photo 371**

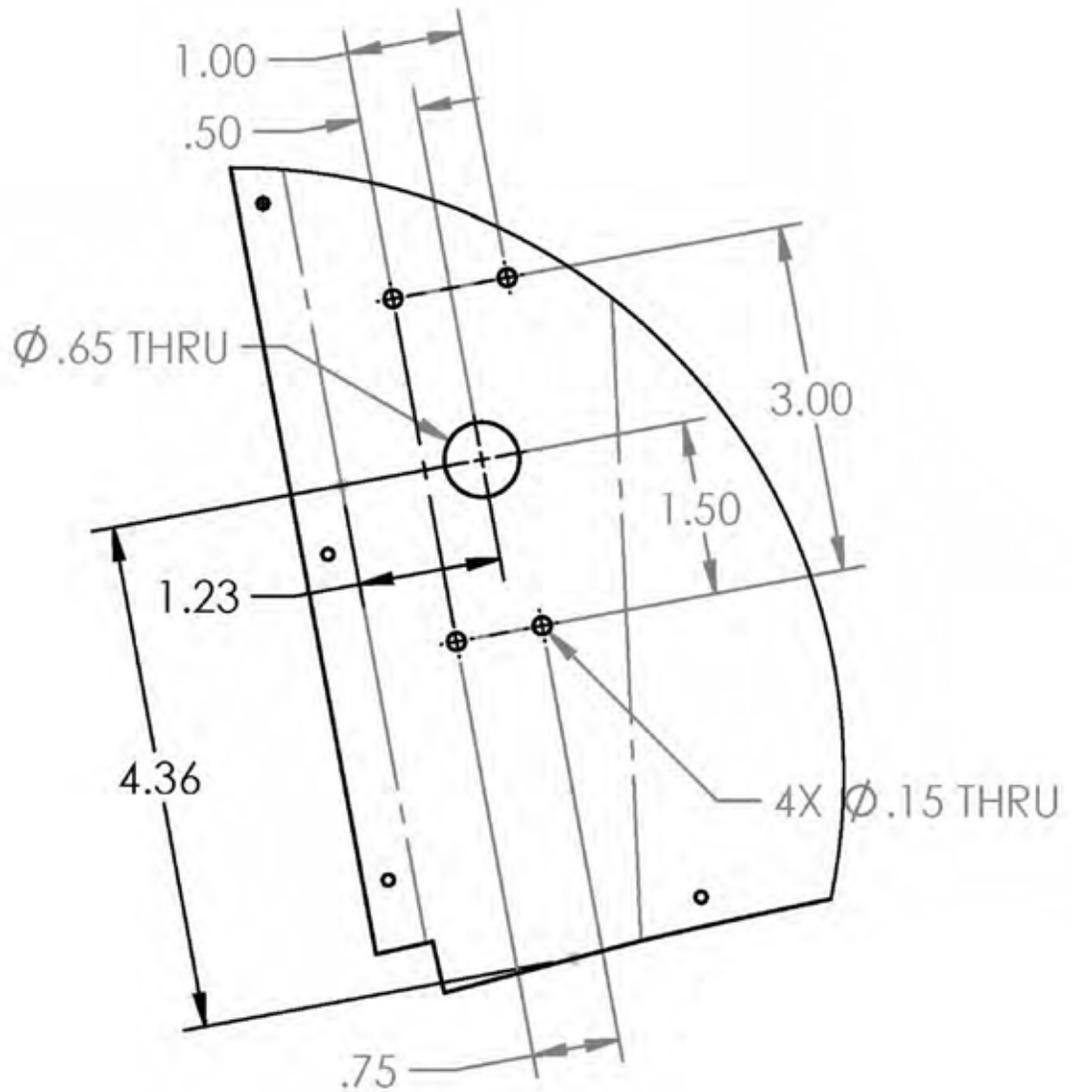
### SECTION 34 FRONT LOW POINT DRAIN

The last item that we will install at this point will be the front low point drain shown in Photo 372. These holes may already be in be drilled in your boot cowl side. If the holes are not in your boot cowl side use Figure FS50 to locate the hole location and hole size.

The installed front low point drain should look like this.



**Photo 372**



**Figure FS50**

**LOG & INSPECTION SHEET FUSELAGE # 9**

**Inspection point**

	INSPECTION ITEMS	BUILDER	ALTERNATE
1.49	Ensure firewall is free of dents and imperfections.		
1.50	Ensure boot cowl sides are free of dents and imperfections.		
1.51	Ensure correct stacking for boot cowl spacers.		
1.52	Ensure that the proper rivets have been used on installation.		
1.53	Ensure gascolator access panel has been installed properly		
1.54	Check over all fit and finish.		
1.55	Ensure High Temp silicone is applied to firewall and boot cowl sides.		
1.56	Ensure High Temp silicone was used to seal seams between boot cowl sides and boot cowl bottom.		
1.57	Ensure vinyl sound proofing installed per manual.		
1.58	Ensure vinyl fabric is enclosed in the installed grommets.		
1.59	Ensure gascolator brackets installed per figure.		
1.60	Ensure gascolator installed per figure.		
1.61	Ensure cabin heat box installed per figure.		
1.62	Ensure there are no dents or dings in boot cowl.		