

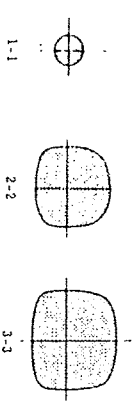
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Cessna®

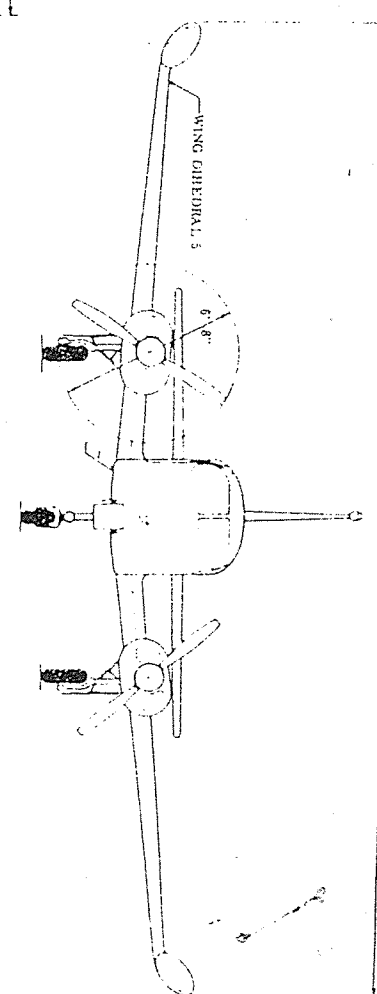
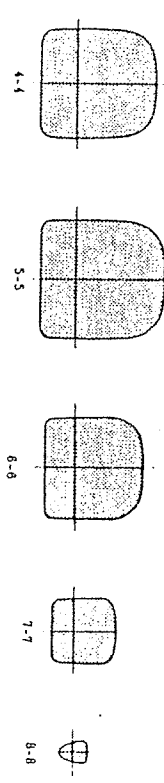
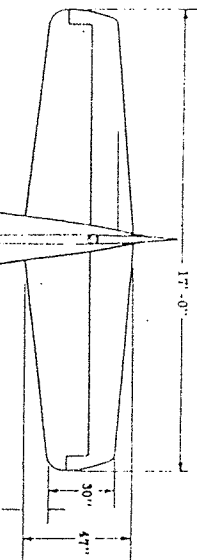
310 G

AIRFOILS

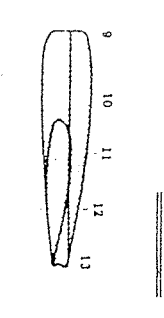
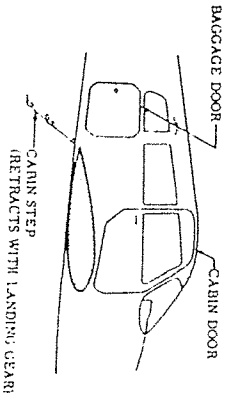
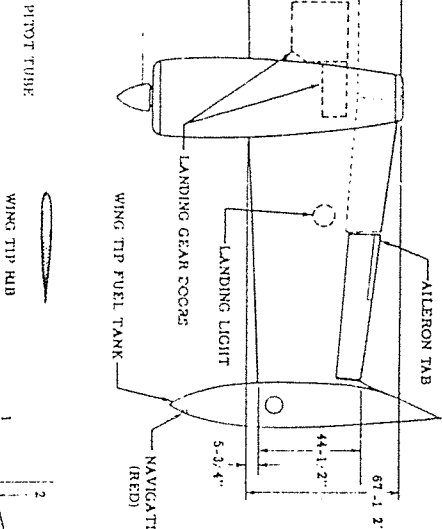
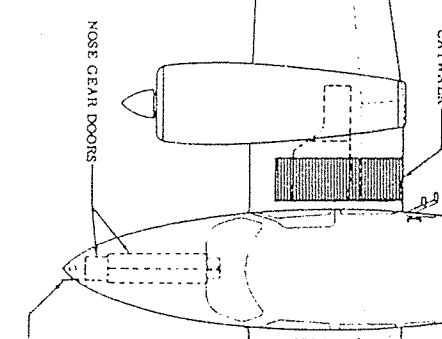
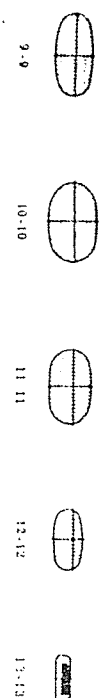
WING: 1 AIRPLANE - NACA 23018
 2 NACELLE - NACA 23015
 TAIL (VERTICAL)
 ROOT (LESS DORSAL) - NACA 0009
 TIP - NACA 0006
 TAIL (HORIZONTAL)
 Q AIRPLANE - 0009
 TIP - 0008
 INCIDENCE:
 WING ROOT - 2°30'
 WING TIP - 0°30'
 STABILIZER 0°



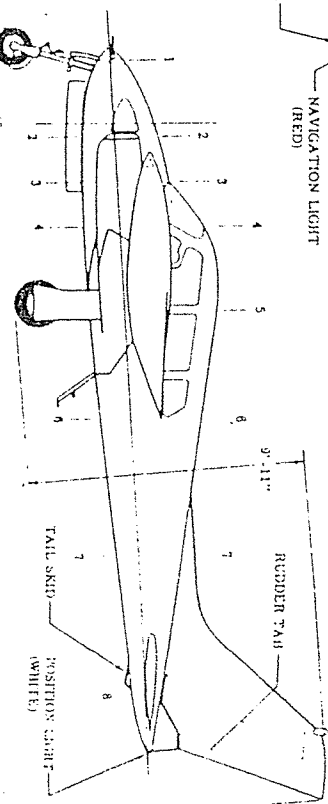
ELEVATOR TAB



WING TIP FUEL TANK
 NAVIGATION LIGHT (GREEN)



SECTION THRU Q OF ENGINE NACELLE



PARTS CHANGE NOTICE--READ BEFORE ASSEMBLY

With this edition of the 310 we have made a number of changes to ease assembly and also to speed production on what has proven to be one of the most popular twins on the model market.

To speed assembly, bulkheads F-2, F-3, F-4, F-8, F-9, and F-10 are now one piece and no longer need be assembled. Our plan still shows assembled bulkheads at each of these stations made up of $\frac{1}{4}$ balsa stock. To locate $\frac{1}{8}$ inch ply replacements place against cross pieces of crutch on side shown.

Note also before removing any wing ribs, horizontal stab ribs or fin ribs from die cut sheets mark the corresponding aileron ribs, ect. for later use.

Keep the tail end of the body light. Hollow all blocks and sand surfaces down well to avoid a tail heavy model.

We suggest the use of .60 engines only--set at 0 degrees thrust--no down--no left. When set up as shown using the above size engines the model will not spin in when one engine fails. NO RUDDER CORRECTION WILL BE NEEDED. Using larger engines we feel would cause a problem. Up to 26 lbs. standard .60s are fine. After 26 lbs. use .60s pumps. The model has been test flown up to 43 lbs. but the heavier the model the poorer the performance. "Beefing up is NOT required."

BODY CONSTRUCTION:

Splice body plan at point shown. Begin construction by glueing together the $\frac{1}{4}$ and $\frac{1}{2}$ crutch directly over top view on plan. Locate crutch as the shaded area. Before removing crutch from plan--locate all formers. Note on the new kit version as per above only formers F-6 and F-7 have to be assembled. Assemble as per drawing of old style F-4 on plan. Note that FT parts are on top and FB parts are on the bottom. FS parts make up the side. Install nose gear bearings on F-1.

We have found that the best way to keep the crutch straight during body assembly is to support it on 5 inch boards every 16 inches or so between formers. If you work on the support until you have the side planking on and the top sticks, the body will remain straight when removed. An important step in body construction is the 1st $\frac{3}{16}$ inch plank marked one on photo number one. Install the top edge of this plank flush with the top of the crutch. Note on photo this will be the center line of the horizontal stabilizer. When all side sheet is on, make a stab cutout template from the side view of the plan. Center the cutout template on the $\frac{3}{16}$ sheet as shown in photo. Mark and cut out.

Build up cabin with balsa parts as shown directly over plan. Note angle on FC 3. Glue up front cabin blocks and glue in place. Epoxy assembly to FT-7. You will have to support front until glue sets and you have the cabin supports glued in.

Install sticks on top of nose, and entire top of cabin and rear fuse. Install F-17 at rear window. Do not glue F-12 and other rear fuselage parts in place until stab is complete.

Remove from crutch supports and glue in triangle to rear lower fuselage. Add lower sticks as shown. At this point we added F-5 and F-11. We then used F-11 as a template to cut out wing saddle. All other body sheet can be added at this time.

WING ASSEMBLY:

Wing assembly is three piece with self aligning metal tubes. Tubing is locked together by installing a sheet metal screw into the tubes working through access hatches in the bottom of the wing. Note also to take apart wing a clevis will have to be unsnapped from the controlling bellcrank.

WING ASSEMBLY:

Wing assembly is three piece with self aligning metal tubes. Tubing is locked together by installing a sheet metal screw into the tubes working through access hatches in the bottom of the wing. Note also to take apart wing at clevis will have to be unsnapped from the control line bellcrank.

Build the wing center section first. Build a right half and a left half to be joined at the center of wing. To build the left half of wing grease the reverse side of the print and lines will show. Build the right half of center section first.

Start assembly by glueing WA-3 parts to ribs W-2 and W-3. Clear holes in balsa for tubing and other cutouts. The wing can be built on a flat board over plan. Pin down rear 1/4 square spar at location shown. Add W-1, W-2 and W-3 ribs pinning down from just back of front spar to trailing edge. Add both top spars and leading edge. Add W-19 and 20, W-21 and bellcrank. Allow assembly to dry before removal.

Turn wing upside down and add front lower spar, 12-3/8 inch landing gear block and bottom sheeting. See photo sheet 3. Note that photo shows wing after joining to left half. Build left half at this time using the same methods. Join wing halves using dihedral braces as a dihedral guide. Install braces W-15, W-16 and W-17. Install W-18 wing hold down. Install 5/16 inch dowels at front of wing as shown drilling holes in leading edge, W-15 and W-16. We located our throttle ribs in the wing center. Wire type cable was used for throttle running through ribs and leaving a good amount at nacelle location to be later run up to engines. Refer again to photo no. 3. Also at this point pushrod should be run to control line bellcrank from center of wing out. Make access hatches for disconnect.

Install 1/2 inch tubes in center section. Trap in place using ply pieces and sheet metal screws. Draw a line on the top of W-19 and W-20 4 1/2 inches in from outermost rib. Refer again to photo #3. This line will be used to center the nacelle cutout after planking the top of wing.

Make sure all parts are in place on center section. The top of the center section can be planked at this time if you are sure of your fit. We would suggest bringing along construction on the wing tips up to the planking of their top surfaces.

Build Wing tips in the same manner as the center section. Note that to obtain the 3/8 inch width of W-14 two 3/16 inch ribs will have to be glued together. Add the 3/8 inch tubing trapping in wing with 3/8 inch sheet metal screws. We would suggest also planking the bottom of the tip sections and then fitting the entire assembly together. Make sure aileron linkages work smoothly. Pipes should be fairly loose until screws lock them together. If all fits well the entire top of all sections can be planked.

Cut a small hole in top planking of center section at about the location of the lines on W-19 and W-20. Refer to photo #4. Cut up plan in nacelle area to make a template of the nacelle area. Trace onto wing as per photo #4. Cut the top sheet out at this location. Center and glue the nacelle formers N-5, N-4 and N-3 in place. Use drawn line for center line. Plug in and glue nacelle side NS-1 in place. You must glue the wing skin to the side of NS-1 as a butt joint. Glue lower nacelle sides NS-2 in place. Glue the Two N-2 halves together and install. Epoxy N-1 in place. Add triangle stock and stringers. (stringers do not show on plan to avoid confusion) Pull cable through to motor area. Make sure it works free. Check all linkages again to make sure they are free. We would suggest a cutout in N-1 for fuel tank installation. Make the cutout off to one side of the motor mount. Motors should be mounted to cowl in fully.

Make sure all parts are in place in nacelle area, then plank top and bottom with 1/4 inch sheet. Note grain direction.

At this time the cowls must be fitted to the nacelles. Sand nacelles to shape of cowls. We have found that nacelle cracking and checking can be stopped by mounting the cowls with grommets--servo style. The rubber will prevent vibrations from reaching the cowls.

TIP TANKS:

Lay out tip tank parts T-1 to T-6 as shown on plan view and epoxy together. Use one 1/2 X 3 X 28 and one 1/2 X 2 1/2 X 28 to sheet top side of tank. Sheet the bottom side of the tank in the same manner.

Sand tanks to cross section shown. MAKE ONE RIGHT AND ONE LEFT. At this time you must sand or file a bevel on the part of the tank that fits to the wing. This angle is not critical but make sure both tanks are at the same angle. MAKE ONE RIGHT AND ONE LEFT.

Tanks are mounted on wing tips so they look from an end view of the wing as though they are level with the wing section. From a front view they must angle out as shown. The angle shown or the exact mounting is not really critical, but both tanks must be the same in relation to each other.

Fit the wing center section to the body at this time. Drill holes in F-5 as needed and install F-18 parts for wing bolt anchor in body. Center wing as you would on a pattern ship and drill and tap F-18 for 1/4 X 20 nylon bolts.

HORIZONTAL STAB AND ELEVATORS:

Build the stab directly over the plan view. When all ribs are in place cut notches from 1/4 X 1/4 balsa spar. Plank top and bottom with 3/32 X 3 X 48 sheet, starting from rear. Use leftover sheet from wing to cover leading edge area. Add S-13 tip parts--shape and HOLLOW.

Build Elevators over plan and plank with 3/32 sheet. Install E-13 parts on each half and use a split pushrod or dual servo setup. Add parts S-14.

FIN AND RUDDER:

Build over plan using parts shown. Sheet with 3/32 x 3 stock. Add tip blocks, shape and Hollow.

FINAL ASSEMBLY:

Glue the horizontal stab in place and align with wing and body. Add parts F-12, 1/2 inch triangle stock and two F-13 fill parts. Add small 3/32 sheet fill and tail cone block. Add the vertical fin in the position shown. Notch out F-13 parts to allow trailing edge stick on fin to plug down in. Use epoxy on above joints. Add parts F-15 and F-16. With rudder in place fit F-14 parts in place and glue.

Add small fillets to tip tank to wing joints, stab to body and fin to body joints. Fit landing gear and check for proper alignment of all assemblies.

FLYING: Set aileron and rudder throws to max. Elevator travel should be 1 1/4 up and 1 1/4 down. Throttle response on both engines should be smooth. We would suggest 13-5 Rev-Up props. When ready for take-off we found it best to go to full throttle quickly holding some up elevator to take weight off of the nose gear. As speed picks up back off on the elevator to almost neutral. The model response is very smooth and unlike smaller trike geared models, you can watch the plane rotate.

