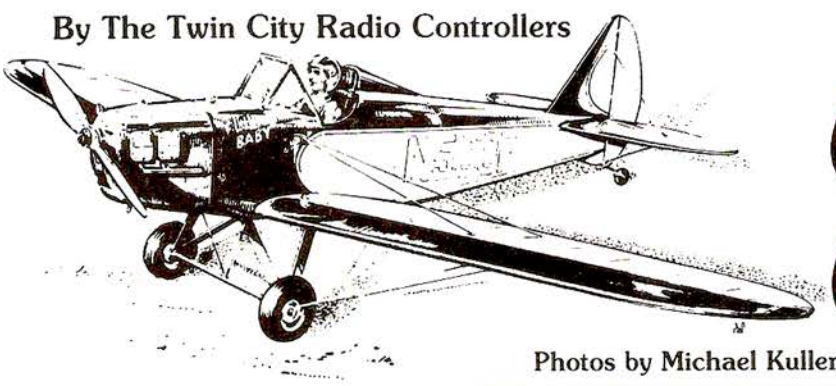
This Fly Baby model is a modeler's model of a full size home-built that was designed and built by a modeler.

By The Twin City Radio Controllers



Fly Baby

Photos by Michael Kuller

ABOUT THE AUTHORS

The Twin City Radio Controllers have been active in the Minneapolis — St. Paul area for twenty-two years. The one hundred members participate in all forms of RC --- contests, airshows, displays and sport flying. Float plane fun-flys in the summer and ski flying in the winter are TCRC traditions on the lakes of Minnesota. At present the Twin City Radio Controllers are working hard at developing a permanent flying site in the Minnesota River Valley.

FLY BABY
Designed By : Twin City Radio Controllers

TYPE AIRCRAFT
Sport Scale
WINGSPAN
72 Inches
WING CHORD
11½ Inches
TOTAL WING AREA
760 Square Inches
WING LOCATION
Low Wing
AIRFOIL
14% Flat Bottom
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
2⅜ Inches
OVERALL FUSELAGE LENGTH
47 Inches
RADIO COMPARTMENT AREA
(L)10" x (W)4½" x (H)4"
STABILIZER SPAN
24¾ Inches
STABILIZER CHORD (incl. elev.)
8½ Inches
STABILIZER AREA
210 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top Of Fuselage
VERTICAL FIN HEIGHT
11¼ Inches
VERTICAL FIN WIDTH (incl. rud.)
10½
REC. ENGINE SIZE
.40-.61 Cu. In.
FUEL TANK SIZE
12 Oz.
LANDING GEAR
Conventional, Skis, Floats
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail.
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa and Ply
Wing	Balsa and Ply
Empennage	Balsa
Wt. Ready-To-Fly	6-12 Lbs.
Wing Loading	21-36.4 Oz./Sq. Ft.

PART I

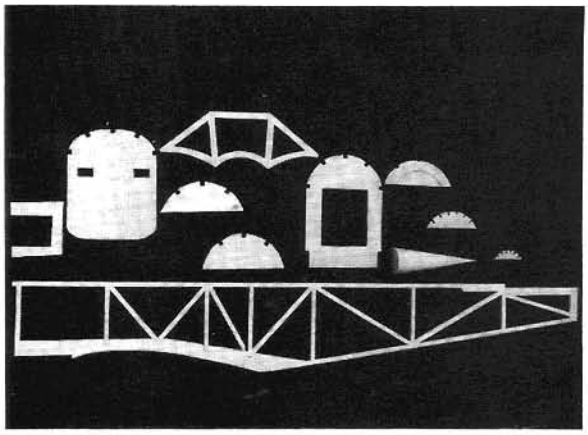
It was a hot Sunday afternoon in the summer of 1963 when "Red" St. Aubin brought his Fly Baby to the Twin City Radio Controllers' field. It was built with the best equipment of the day --- F & M radio, Annco servos, Veco .45 engine, silk and dope covering, and lots of number 64 gum bands to strap the wing onto the fuselage. "Red" fueled up the new Fly Baby, started the engine and taxied past the other ships in the pit --- a couple of Tauruses, a Mambo and several rudder-only Champs --- and took off crosswind to avoid the pine trees on the south side of the field. Just then a small tumbleweed was also making a take-off run of its own, blown by the wind, on a collision course with Red's Fly Baby. Other flyers looked up from their task of winding escapement rubber bands or tuning their superregen tank coils and gasped as the Fly Baby hit tumbleweed just as the Fly Baby was rising off the ground.

Both plane and tumbleweed arose together into the air; the tumbleweed was snagged on the Fly Baby's tailwheel. Although Red was the best flyer in the club, we all wondered how he would handle this problem.

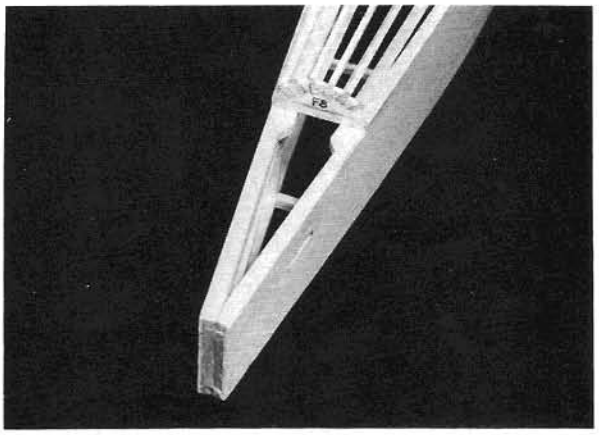
Red flew Fly Baby as if the tumbleweed didn't exist. He pulsed the five switches on his ten channel transmitter through rolls, loops, hammerheads, inverted flight --- the whole aerobatic sequence. The Fly Baby flew as though the tumbleweed wasn't there. Most of us were so fascinated that we collapsed the antennas on our Orbit and Ace tone transmitters and watched the entire flight.

Since those early days of "multi" radio control at least eighteen Fly Babys have been built by TCRC members. Its popularity is due to those flying properties

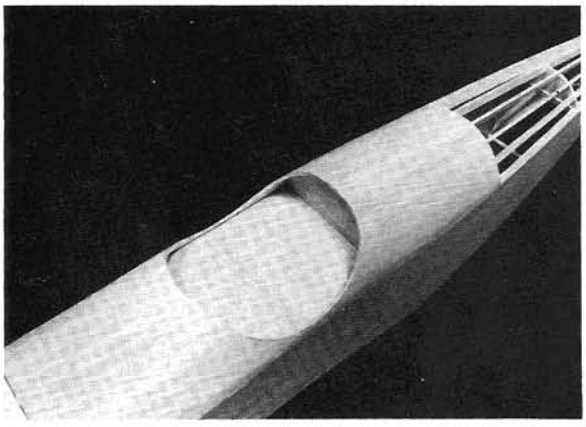
The full size Fly Baby --- photo courtesy of Pete Bowers.



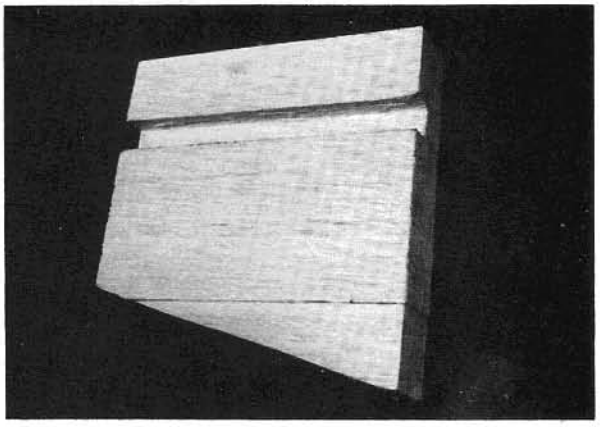
Fuselage frame and formers.



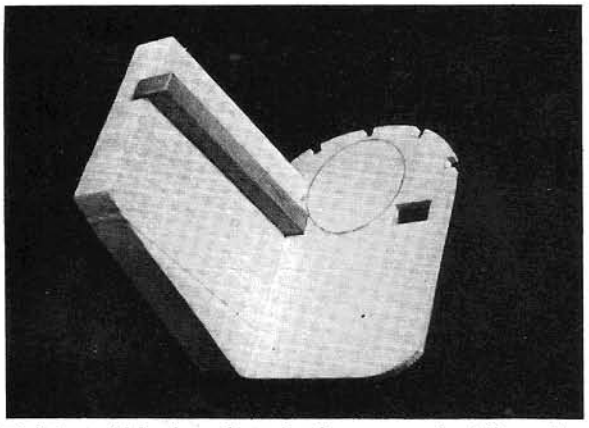
Fuselage rear ready to receive empennage.



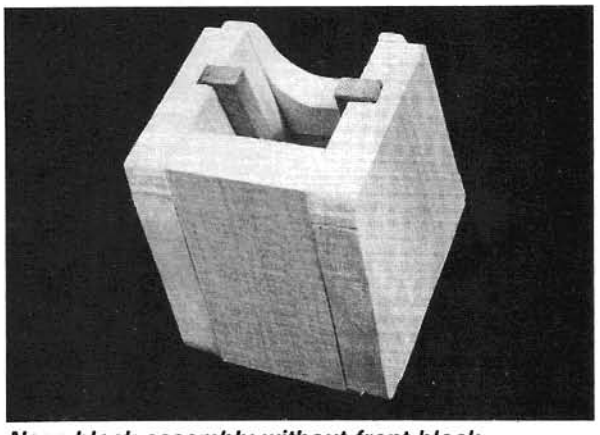
Cockpit cut-out.



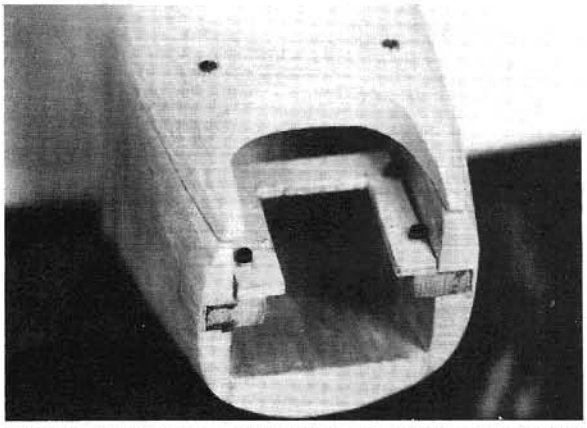
Right cowl block.



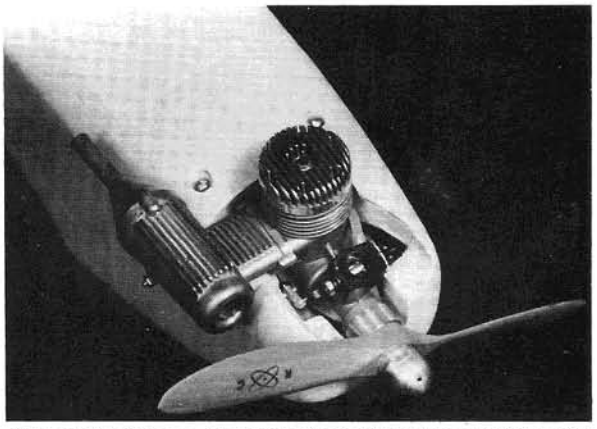
Right cowl block and engine bearer against firewall.



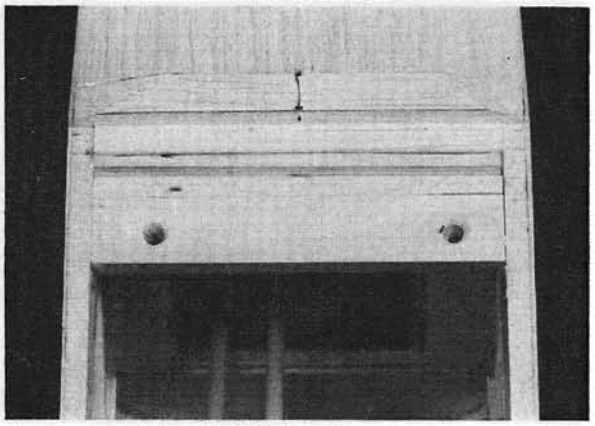
Nose block assembly without front block.



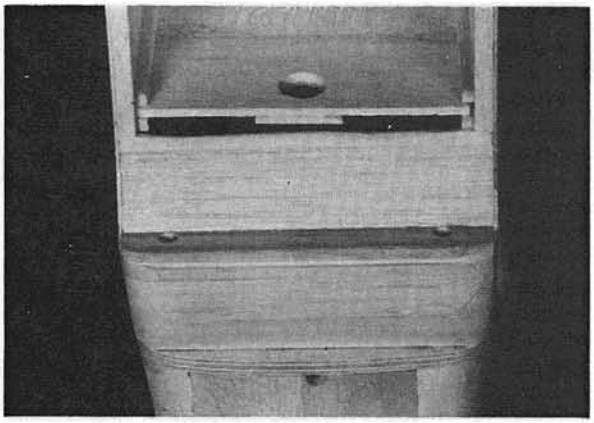
Completed nose section minus front block showing engine mounting plate.



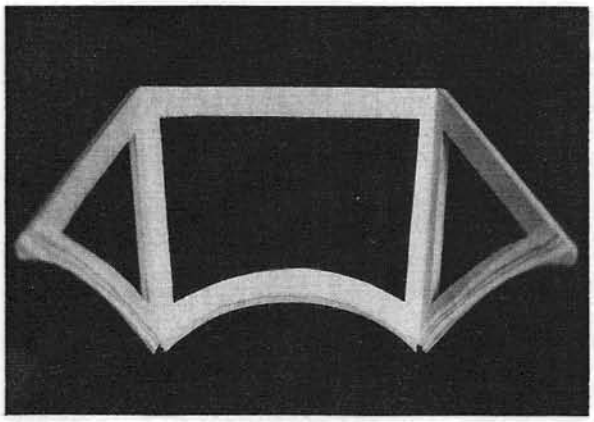
Completed nose, ready for finishing. Super Tigre .60 with Perry carb.



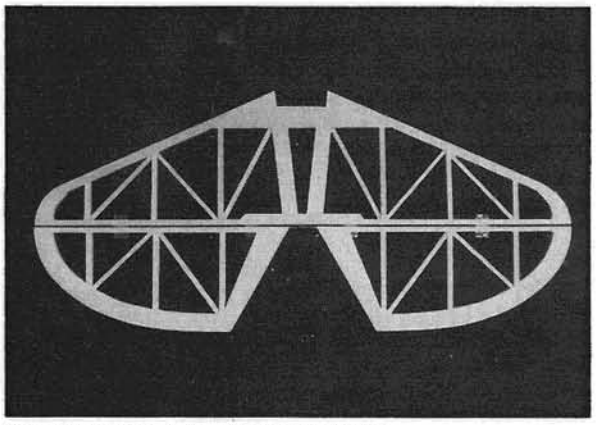
Fuselage at wing bolt holes.



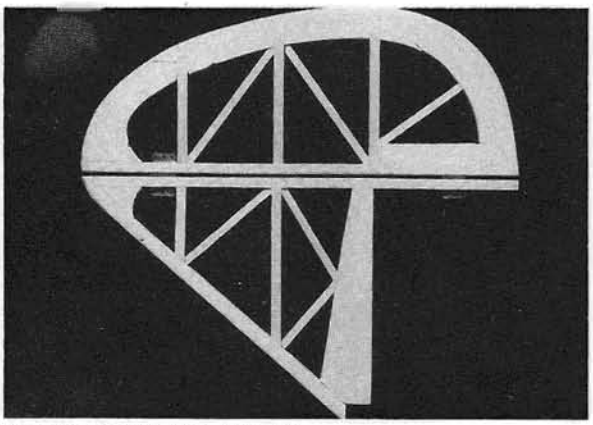
Fuselage at wing leading edge. L/G block also used for wing dowels.



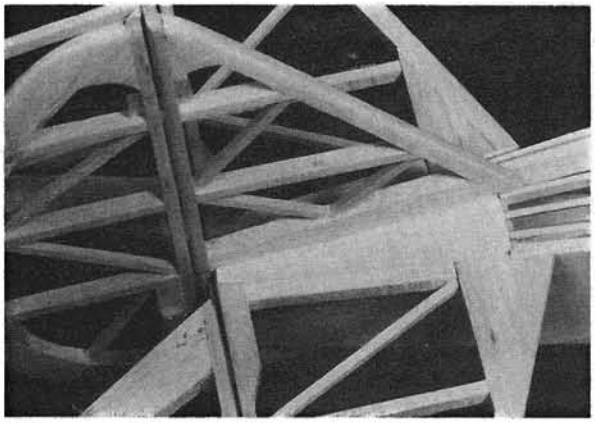
Windshield frame — note bevel to fit fuselage contour.



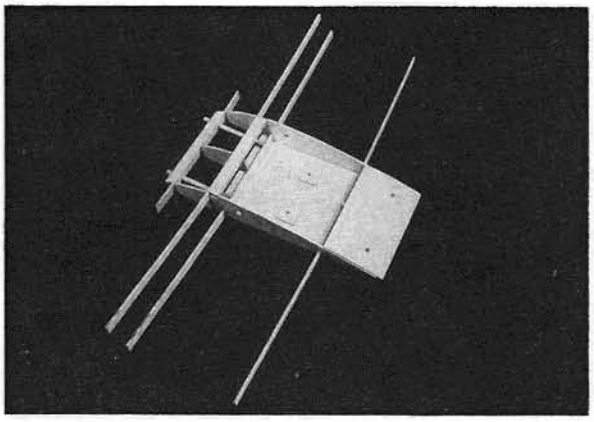
Completed stabilizer and elevator.



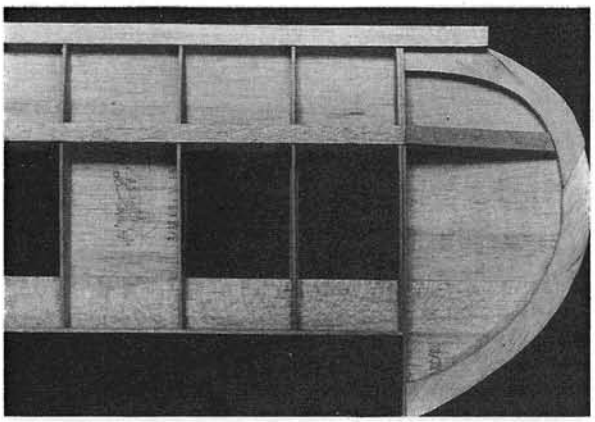
Completed rudder and fin.



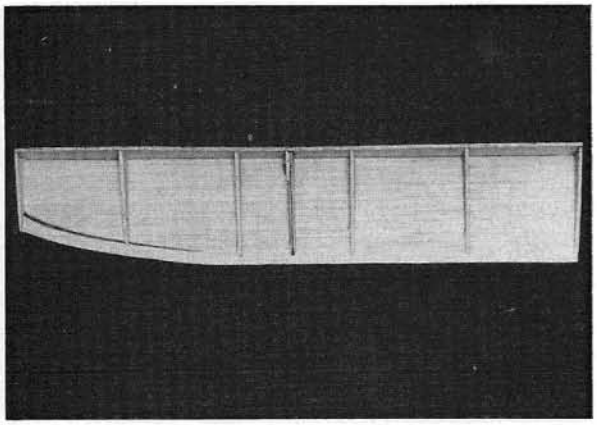
Tail assembly complete and installed.



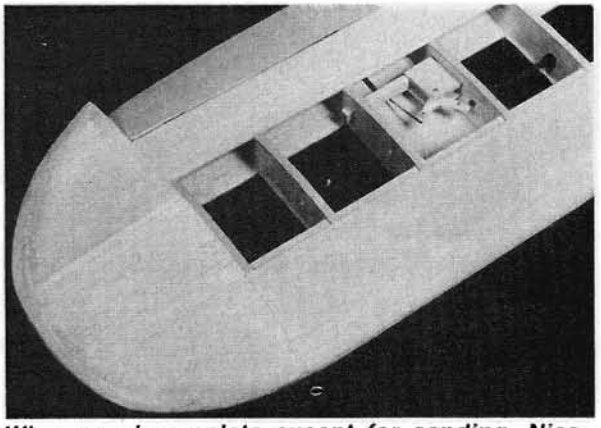
Wing center section with dihedral braces and wing dowels in place.



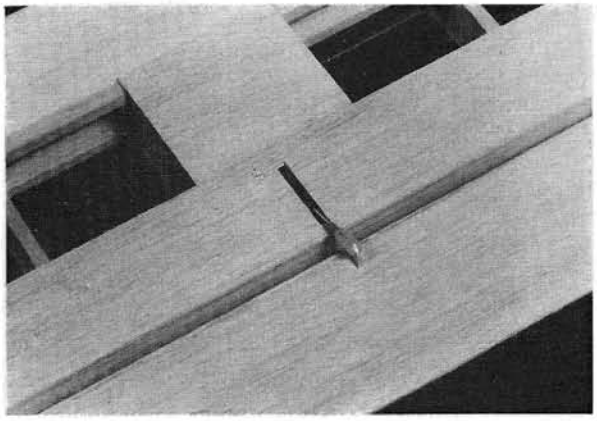
Wing panel shown with bottom sheeting. Bellcrank to be added.



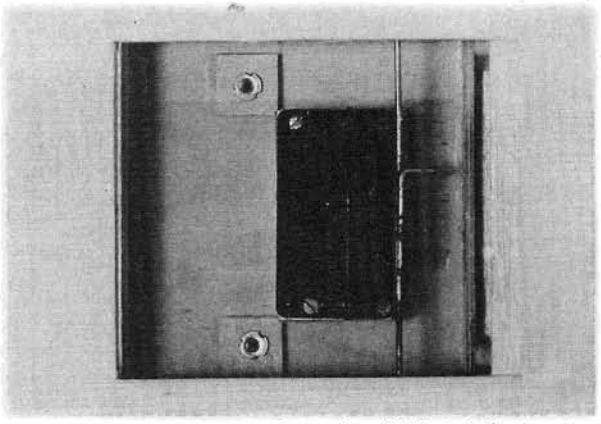
Aileron structure without top sheeting.



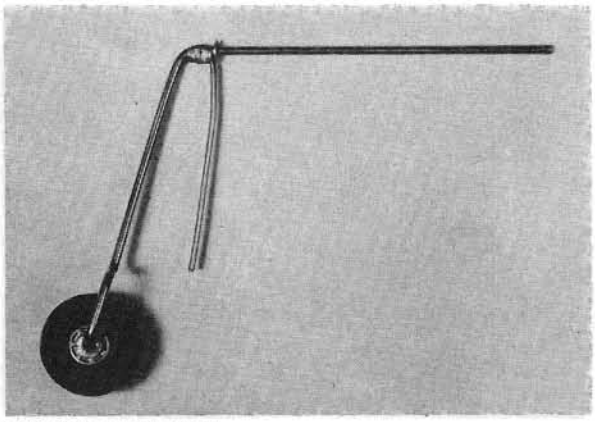
Wing panel complete except for sanding. Nice bellcrank mounting.



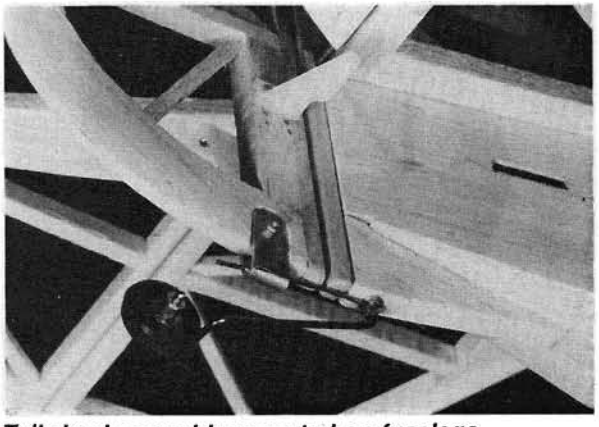
Aileron pushrod exit and horn.



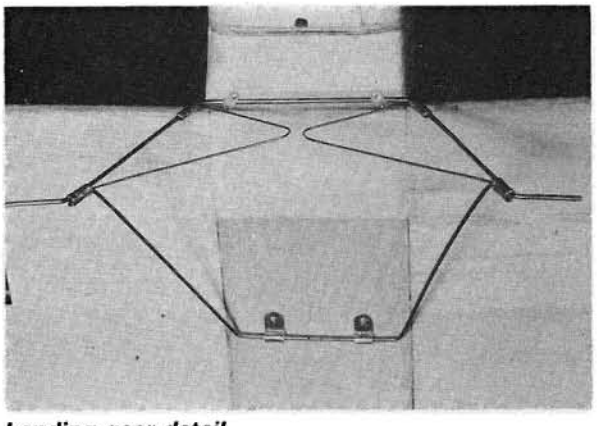
Aileron servo mount and pushrod. Note blind nuts for rear L/G leg hold-down screws.



Tailwheel and strut.



Tailwheel assembly mounted on fuselage.



Landing gear detail.

Completed model ready for covering.

that made Red's tumbleweed duet possible --- a large tail area for stability, generous control surfaces for positive handling and a simple rugged structure to survive the unexpected.

The plane is as popular as ever. To date there are seven Fly Babys in active use by TCRC club members.

Larry Gelo designed the TCRC's model version of the popular homebuilt in the early 1960's. Larry's original Fly Baby is still flying, having changed hands among club members several times and flown with skiis and floats as well.

The Twin City Radio Controllers feel that it is about time that we share the Fly Baby with the rest of the aeromodeling world. So we proudly present the Gelo Fly Baby brought up to date as it is built and flown by the TCRC today.

The Full Sized Fly Baby:

Pete Bowers designed the full sized Fly Baby, but Pete started his career in aviation as a model builder. He designed a high wing free flight also named Fly Baby and flew it in the Ntionals in 1940. Much later the full sized Fly Baby was designed; its construction remarkably similar to its model predecessor. Fly Baby was designed in response to a contest sponsored by the Experimental Aircraft Association to develop a homebuilt design that would be safe to fly and easy to construct by the many amateur air enthusiasts remaining after World War II. The Pete Bowers Fly Baby won the EAA contest and the design has been very popular among homebuilders ever since. Given this history, it is not surprising that returning the Fly Baby to model form has resulted in a rugged and well flying model.

Construction Notes:

The plans presented here show the Fly Baby as Stand-Off Scale in the original intent of the term, i.e., the outline and shape are close to scale, yet scale details have been simplified. The intention is a model that build easily, flies great and looks scale in the air. To win contests might require inverting and cowling the engine, adding flying wires and cockpit details. Scale references are shown on the plans for those who wish more attention to scale.

Fuselage:

The fuselage is a time honored stringer and former structure. Start by building the fuselage sides over the plans. Glue medium to soft 1/16'' sheet balsa slightly larger than the fuselage sides to the side frames while the frames are laying flat on the work bench. Trim the side sheeting. Now lay one of the fuselage sides flat on the bench, sheet side down and glue formers F1 and F4 in place. Be sure that these formers are perpendicular to the fuselage side by using a protractor or triangle. Then glue the other side in place, with weights above F1 and F4 while the glue dries. Add the formers and cross braces between F1 and F4. If you have used the same density balsa for the two fuselage sides, it is possible to pull the ends of the fuselage together, each side bending by the same amount. Add the remaining formers and cross braces. Cut the pushrod exits and fit, but don't install, the rudder and elevator pushrods. It is best to do this now, when the insides are so accessible. Stiff balsa pushrods are recommended, especially for the elevator.

It is possible to plank the fuselage top with only two sheets of 3/32'' balsa if a notch is cut in the cockpit area and soft quarter grained balsa sheet is used. Install cockpit floor before sheeting the fuselage top. The top of the fuselage from F6 to F8 is open stringers. F5 is glued to F6 such that the outline of F6 is within the outline of F5.

Like the full sized Fly Baby, the bottom is sheeted. But, this sheeting may be omitted if you wish to save the weight.

A structurally critical part of the fuselage is the hardwood block that supports both the forward landing gear struts and the wing leading edge dowels. Cut the notch in the support balsa block that will hold this hardwood block and install the balsa block in the fuselage. Do not glue the hardwood block in place until the wing is fitted to the fuselage. The two holes that receive the wing dowels should be drilled at the same time that the holes in the wing leading edge dihedral brace are drilled. (See the Wing Construction notes.)

The engine bearers are set in grooves cut in the nose side blocks. These grooves can be cut with a razor blade or razor saw and chisel, or with a table saw or router. Note that the depth of the groove is deeper for the left bearer than for the right bearer. This difference is caused by the 3'' right thrust offset.

Hatch hold-downs are simply two long machine screws that screw into blind nuts in the engine bearers.

The removable bulkhead between F1 and F2 is a throwback to reed radio days which is still useful. The original use of this slide-out bulkhead was to mount the receiver to the bulkhead with foam rubber and rubber bands. Modern radios are not so vibration critical so this purpose is no longer necessary. Instead, this bulkhead holds the battery pack and receiver wrapped in foam rubber, in place, forward of the former. The former slides out for access to the battery pack, receiver and tank.

Cut the canopy opening as follows: Trace the cockpit pattern onto tracing paper (don't cut it out of the plans, you will spoil them). Cut out the tracing paper pattern and lay it on the fuselage, positioning it equally between formers F2 and F3. Then trace around the pattern with a felt-tip pen. Finally, cut through the tracing with a single edge razor blade and trim with a #11 X-Acto blade.

The most difficult part of the whole project is the windshield. The joints should be mitered at approximately 45° and glued with epoxy. Tape the three pieces together and position on the plane while the glue sets. A piece of waxed paper under the windshield will prevent it from sticking to the fuselage. The next step is to bevel the windshield frame to mate the fuselage. An X-Acto knife is a good tool to do this. Take your time and make a good fit. The windshield frame should be firmly epoxied to the fuselage.

The windshield has a very practical purpose. The fuselage will be supported by the windshield when the fuselage is placed upside down on the work bench or on the flying field for working on the radio or attaching the wing. The windshield frame provides a firm backstop for your hand when holding the plane while starting the engine.

Tail:

The Fly Baby has a rather large tail and a long tail moment. This gives the plane stability and control but creates the risk of unnecessary weight build-up. Excess weight in the tail must be balanced by four times as much nose weight. Most Fly Babys have not required any nose weight for balance but, because of the large tail, some care in material selection is wise. The only pieces in the tail that should be hard balsa are the stabilizer center spar, its center reinforcement, and the rudder post. Trailing edge pieces may be soft balsa and the stab-fin fairing may also be soft balsa. All other members should be medium density balsa.

Build the tail components over the plans. Taper the trailing edges and bevel the leading edges of elevator and rudder before hinging. The leading edges of the fin and stab should be rounded.

Wing:

All the ribs are derived from the same airfoil, so the stacked rib method of cutting the ribs may be used.

There are four dihedral braces. The leading edge brace must be drilled to hold the wing dowels, and these holes must align perfectly with the holes in the hardwood block in the fuselage. Clamp the fuselage block and the leading edge dihedral brace together. The top of the dihedral brace should be aligned with the top of the fuselage block. Drill two 1/4'' holes through both pieces. Do not install the fuselage block in the fuselage until the wing is completed, ready for covering. The fuselage block may be glued in place as soon as the wing has been fitted to the fuselage. Use the completed wing to align the fuselage block in the fuselage.

Wing construction is classical. It may be built on a flat surface due to the flat bottomed airfoil. Use hard balsa spars.

Soft balsa should be used in the wing tips. Bevel the wing tips before top sheeting. Check this bevel by placing a straightedge span-wise over the last rib W6 and the wing tip.

Aileron pushrods may be 1/16'' stiff wire, long Kwik Link pushrods, or stiff dowels. Avoid Z-bends in the aileron linkage, as this will only increase aileron play and risk flutter.

Join the two panels to the center section, raising the wing tips 2⅜''. Be sure that all parts of the bottom of the wing are parallel to the workbench at this point. Top sheeting may then be applied.

The trailing edge of the wing is bolted to the fuselage with two nylon bolts. One bolt would be strong enough, but sometimes the bolts work loose during a long flying session so two are used for safety. Drill a slightly undersized hole through the wing and wing block while the wing is in place on the fuselage. Test the wing for correct alignment before drilling by measuring from each wing tip to the end of the fuselage. Remove the wing and drill the holes in the wing to the same diameter as the bolt, and thread the block in the fuselage with a tap having the same diameter thread size as the bolts.

Landing Gear:

The main landing gear works on a sort of oleo principle. On impact the struts tend to spread apart, and this force is resisted by several turns of a #64 rubber band. This landing gear will resist a smashing touchdown without breaking a prop, but yet it is absorbent enough to prevent bouncing during a reasonable landing.

Clean and wrap the joints with copper wire and solder them with silver solder. The axles must be directly below the leading edge of the wing.

For wing removal, the bolts on the rear strut must be removed from the wing. Use blind nuts Hot Stuffed in place in the wing.

Install the tailwheel strut inside its brass tube and then install it in the fuselage. This is most easily done before the tail is glued to the fuselage.

Power:

Recommended power is .40 to .61 cubic inch engines. A .40 will give scale flying speed if weight is low, but will be lacking in vertical maneuvers. A strong .60 might be too much if the pilot uses too much full throttle. One should use the power of a .60 for acceleration or climbing, not for speed. The full power of a .60 will pull the Fly Baby at a scale speed of over 300 scale miles per hour in level flight --- too fast.

The thrust angle shown contains no down thrust. This will cause the Fly Baby to climb under power, just like the full size plane. But some flyers prefer their planes to not climb under power but merely accelerate. In this case, two or three degrees of down thrust are recommended.

Flying:

The Fly Baby is easier to fly than many trainers, so no big dissertation on this subject is required. A little right rudder might be required for a straight take-off. It looks nicer if you just let it rise off the ground by itself, without using any up elevator.

Ground handling is super. One Fly Baby pilot claims that his plane has never broken a prop except when it hit a tree.

Taxiing in a strong crosswind can sometimes be a problem because the fuselage side wants to weathercock into the wind. To overcome this, hold full up elevator, and goose the throttle. The prop wash will drive the tailwheel down and improve steering.

Inverted flight requires some down elevator, and rolls require more down elevator than up elevator. This is due primarily to the flat bottom airfoil. However, this airfoil combined with the large control surfaces gives good low speed control.

Weight is not too critical. Fly Babys have been built from six pound to twelve pounds of flying weight. All flew well and not too fast.

Construction of the skiis and the floats as well as flying instructions for each will be described in next months issue of RCM.

The airplane presented here is the result of sixteen years of development & nearly twenty prototypes. Fly Babys have flown in countless airshows, contests and fun-flys. The have flown off water, snow, sod, paved runways, farmers' fields, and dirt roads. They have towed banners and flags, dropped candy and parachutes, and laced the sky with smoke bombs. The Fly Baby loves to fly. If you love to fly too, perhaps there is yet another Fly Baby that is waiting to be built.

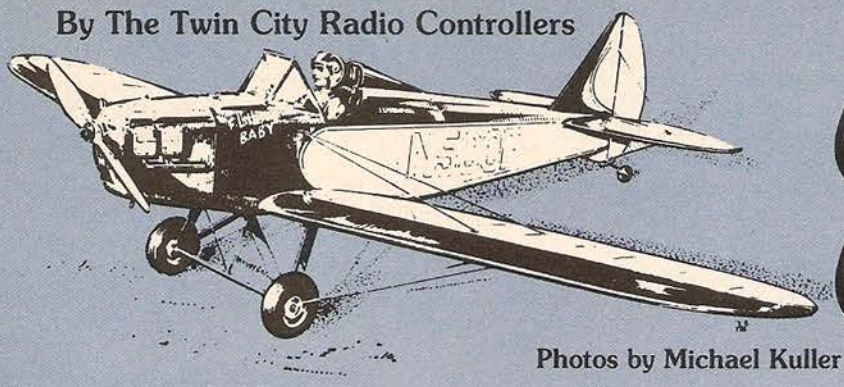
MATERIALS LIST

All material is balsa unless otherwise specified.

(3) 1/8 x 3/8 x 36
(1) 1/4 x 6 x 12 ply
(1) 1/8 x 12 x 24 ply
(2) 1/4 Sq. x 36
(7) 1/4 Sq. x 48
(3) 1/4 x 3/8 x 36
(3) 3/16 Sq. x 36
(4) 1/4 x 1/2 x 36
(1) 3/8 x 1/2 x 36
(2) 5/8 Sq. x 36
(5) 1/16 x 3 x 36
(12) 3/32 x 3 x 36
(1) 1/4 x 3 x 36
(1) 3/8 x 3 x 36
(1) 1/16 Piano wire
(2) 3/32 Piano wire
(2) 1/8 Piano wire
(2) 1 x 3 x 6
(1) 1 x 4 x 6
(1) 1 x 6 x 18
(1) 1/8 x 3 x 36
(1) 1/2 x 5/8 x 12 maple
(1) 1/2 x 7/8 x 12 maple
(1) 1/4 inch dowel □

Editing By Hlsat.
RCModeler
May 1980.

By The Twin City Radio Controllers



Photos by Michael Kuller

Fly Baby On Floats

PART II

The Fly Baby plans include three different undercarriages. Virtually everyone flies with wheels on their model airplane, and snow skiis are great fun in snow for those who dare brave the cold. But neither one of these methods provide the thrill experienced by flying with floats. A great choice for a model float plane is the Fly Baby since the full scale Fly Baby has flown with floats. The model Fly Baby far surpasses the regular sport model, both on the water and in the air.

Assuming most of you have never "flown floats," let's get into what you will experience differently from wheels or skiis.

Picture your Fly Baby sitting on your favorite sandy shore. If there are other people in the area you have picked, they are all now standing around your airplane. The grownups will be on the beach and the youngsters will more than likely be standing in the water, some with their tennis shoes still on. This is exciting and they want a front row seat.

Fuel it up and turn the radio on. Check everything out just as you would a land plane. Now you have everybody amazed when you move the control sticks because the control surfaces move. Amaze them further by using an electric starter to start the engine. Always start the engine at idle speed. This brings a more dramatic effect when you hit the loud lever on the take-off run.

It's launch time. The kids gladly move out of the way when they are asked to because they know the time has come to fly. Yet, they really don't know what to expect. Pick up the airplane to put it in the water. Pick it up with a little groan like the weight of it makes your back hurt. People react better to big and heavy. Set the airplane in the water with a bit of splash. Once again --- big and heavy. The airplane is now sitting in the water, engine ticking over, and radio on. Call out in a firm loud voice, "Everyone stand behind me so that I can see to fly this thing." Suddenly you are king of the shore as everyone scatters to a spot behind you. The plane is bobbing gently in the little waves licking at the floats and forward motion is evident. Give a little throttle and taxi Fly Baby downwind until it is about 100' away. This will give plenty of room for a long take-off run with lift-off right in front of your awe stricken spectators.

The moment has come. It is time for take-off. Fly Baby is turned into the wind and you announce loudly, "Leave me alone now. I have to concentrate on flying." While holding full up elevator, give full throttle. The quiet is broken with a high revving engine. The floats are creating quite a splash as the plane rushes forward nose high. Speed builds rapidly as the floats climb over the hump of water to get on the step. Practically all of the up elevator has been released now and the floats are skipping along on the step. Nudge in a little up elevator and Fly Baby will rise from the water. No longer does it leave a wake except for that created by the water streaming off the floats.

Not only is Fly Baby flying, but so are the questions. "How fast is it going, how far away can it go, how high does it go, what is your plane made of?" A kid whispers loudly to his friend, "Won't it be neat if it crashes?" Remember how you told them before take-off to leave you alone so you could concentrate? Just tell them you'll answer their questions later and go on to describe what the plane is doing.

Now is the time to pull out all the stops. After that scale-like take-off and climb-out, get their attention by telling them to not take their eyes off the airplane because they might miss something really tremendous. Turn around way upwind and bring Fly Baby back in a shallow dive destined for a roaring, low level, close in fly by. Get close enough to give them a full dose of the Doppler effect. That usually gets the spectators' hearts pounding. Climb out going downwind and split-S to set up for a big loop. Let it come "down the hill" to pick up speed. At about 150' out and 20' up, pull in elevator for a big loop. Make the loop big enough to give your spectators time to appreciate it, yet not so big that the loop is out of scale.

Come up with a different maneuver on each pass. Keep them wondering what will happen next. Do the landing the same way. They don't know it, but instead of just a landing, a touch and go is coming up. Set up your approach carefully to make sure the spectators get a good look at the touchdown.

On the final, keep the speed up a little --- just enough to allow a gentle rate of descent and touchdown on the floats steps. As soon as Fly Baby touches, give full throttle and hold in a little up elevator to keep the float tips from digging in due to the power surge. Let it built up speed again as you release up elevator to get it back up on the step. Once on the step, put in a bit of up again and watch it lift free from the water. The audience has become unruly from the excitement.

Come around and set up for the final touchdown. This time slow down enough to let the plane sink nose high using elevator to control the angle of attack. Just about a foot off the water, increase the engine speed slightly to slow the rate of descent. If all was done properly, the water rudder will kick up a rooster tail as it touches the water. Then the aft portion of the floats touch down parallel to the water. After it touches, keep Fly Baby moving with high idle speed. This is for realism. Now give full up elevator and full low throttle. Fly Baby will rear back in a tremendous flurry of spray and the sound of rushing water. Forward motion stops and the wake catches up to the floats with more rushing water sounds. Let the plane bob in the effect of its wake before giving a touch of power to turn towards shore. While taxiing back, hurry things up by feeding in about one-half up elevator and about one-third throttle. The result is a high speed taxi below flying speed and above the heavy spray speed. About 30' off shore, chop throttle and give full up elevator to give your audience a front view of Fly Baby rearing back to stop. Taxi back to shore slowly with engine quietly ticking over muffled by the applause of the estatic onlookers.

Float flying is basically the same as flying with wheels except for a couple of tchniques:

(1) Use up elevator to keep the front tips of the floats up during taxiing, take-offs and landings. Letting the tips dig in when moving fast is almost a certain flip-over.

(2) Attempt to make turns while taxiing only while moving slow or moving fast on the step. At any speed in-between, the floats are too deep in the water and consequently resist turning.

The Fly Babys flown off the water by T.C.R.C. members have had no modifications except to attach the floats. A few precautions are in order, however. When building, be sure to use a waterproof glue throughout. Adding a couple coats of dope wouldn't hurt either. That is, all over the airplane structure inside and out before covering. To keep water out of the fuselage at the wing, use whatever wing-fuselage seal is handy. And last but not least, be sure the radio and engine work 100%. It is much more fun to taxi out, take-off and fly, and taxi back without having to hassle with a boat to retrieve a balky airplane.

Those of you who have read this and haven't been motivated to pursue float plane flying, gain the pity of those who have tasted of its fun. Dig in and be determined to get in on it.

FLOAT CONSTRUCTION

Before starting construction, sit down and just look over the float plans. Even though the construction is simple, it is reassuring, when building, to know how pieces are supposed to relate to each other.

To speed up part cutting, use this idea: Use double sticky side tape to hold two pieces of wood together where duplicate pieces are to be cut.

Start construction by cutting out two crutches and two sets of bulkheads. After some careful cutting there should be two identical crutches and two identical sets of bulkheads. To avoid confusion later, number the bulkheads. Assembly can proceed by simply applying glue to the surfaces to be joined and slipping the bulkheads in the appropriate slots on the crutch. There is no need to pin anything to a building board. Just be sure that the bulkheads are square to the crutch and that the edges of the bulkheads are flush where they intersect the crutch on the top and bottom. If not, trim to fit. Cut the 1/8'' plywood sub-floor according to the plan. Draw a centerline on the sub-floor. Glue the sub-floor into position with the crutch directly over the centerline. Masking tape is excellent for holding parts in position while glue is drying.

Select two matched pieces of soft 1/4'' sq. x 36'' balsa for the top stringers. Glue a stringer on each side of the float with the center of the stringers length at F6. Tape the stringers to the bulkhead to hold them while the glue dries. Continue gluing the stringers to each bulkhead ahead of and behind F6, holding them in place with masking tape. Pay special attention to keeping the crutch straight while drawing the stringers up to the bulkheads. After the glue has set, remove the tape. Select a soft 3/32'' sheet of balsa for the top deck and cut it slightly oversize. Glue the top deck into position and use tape to hold it.

Go on to gluing on the bottom stringers just as you did the top stringers. When the bottom stringers are glued in place, cut to size and glue in the 1/8'' sq. balsa supports on the aft side of F6 to support the planking

at the step.

At this point, other construction articles will tell you to move on to another step in construction, go to bed or go watch TV. Instead, why not fantasize a little. The floats have now taken on their finished outline. Take the wheels off the Fly Baby. Hold her aloft in one hand and hold a float in position underneath with the other hand. Get an idea how super neat this is all going to look when it is finished. A less clumsy way to get a picture in mind of the finished product is to simply lay out the fuselage plans and position the float under the side view. Invision how the sky is blue and the water is clear. Fly Baby is floating with the engine idling, ready to go. You have just pushed the throttle stick all the way forward. The nose of the plane rises and the floats try to climb up on the step. The engine is putting out for all it is worth and water is spraying off the bottom of the floats. Fly Baby is getting light now as only the steps are touching the water. The brisk spray of water suddenly stops when you give a bit of up elevator. Water streams off the floats as Fly Baby claws for altitude. Take-off was successful and all is well with the world as far as you are concerned right now. Get into this a little. Imagine how much fun you are having doing touch and goes and those beautiful stretched out full stop landings. Pretend your Fly Baby is taking you to a remote lake in Northern Minnesota for some fishing by flying high overhead. Come down real low and buzz the lake. Look for the reflection of the plane on the lake as it skims over the surface. Who cares if the dollar isn't worth much in Japan. It isn't all that important when you are busy flying floats. Is the glue dry yet? No? Okay. Go down to the library and get some books on float design and flying. Read up on this exciting way to fly. If you can put the book down, check out the glue. It's dry? Great! Let's get these things done.

The float bottoms are to be covered next. The bottom stringers must first be trimmed to match the bottoms of the bulkheads. A razor plane and a flat sanding block are needed here. Cut firm 3/32" sheeting slightly oversize for the fore part of the float. Make a piece for each side of the crutch. Trim and fit each piece until both pieces butt up together perfectly at the crutch. Glue the bottom planking on, again using masking tape to hold pieces into position. Because of the compound curve which exists on the bottom fore part, pins and thumbs might come in handy to hold parts until the glue is dry. The aft portion of the bottom is much simpler to plank because there are no compound curves. Simply cut a piece of 3/32" sheet to size for each side of the bottom aft and glue and tape it into place.

Joining the two floats with the spreader bars is next. The method shown on the plans is really simple, but not too streamlined looking. Feel free to modify them. The next step up would be to use 5/16" dowel for a spreader which has a more pleasing round shape. The optimum would be the KS streamlined tubing. With it, a section one size larger can be permanently mounted inside the float. The spreader can then be made removable for easier transportation. Before gluing the spreaders in place, the stringers must be trimmed and sanded flush with the bulkhead sides just as was done on the bottoms.

Set the floats upside down on a smooth flat surface and position them parallel and square to each other. Tape them to the work surface to keep them from being moved. Slide the spreaders through the hole in the crutch. Glue the spreaders to the bulkheads. Double check to make sure the floats have not been moved out of the parallel square position. Let this dry thoroughly.

Cut to size and glue on the side planking. When the glue is dry, sand all overhanging sheeting flush with top and bottom. Now, here is the key to an excellent performing set of floats: Keep the chines and steps **sharp.** The chine is the edge where the bottom and side of the float meet. The step is the part halfway back on the bottom of the float where there is literally a step. By keeping these parts sharp, the water moving past will leave the float cleanly and allow the float to break surface tension with the water.

The next part of construction will be a lot easier if you invest in a wire bender and a carborundum cutting wheel for your Dremel tool. The wire struts are next.

With the wire bender, bend two pieces of 1/8" music wire to shape according to the plans for the main float struts. Also, bend the fore-aft braces to shape. Cut off excess wire after bending with the cutting wheel and Dremel tool.

Assemble the Fly Baby less the landing gear. Locate the thrust line on the side view of the plane and mark that line on the side of the fuselage. Attach the front and rear struts to the floats according to the plans with straps and screws. Set the airplane upside down in a support of some kind. Attach the front strut in the landing gear slot ahead of the wing with straps and screws.

The next step is important for easy take-offs. The step must be positioned directly below the C.G. (in the upright position) and the top of the float must be parallel to the thrust line. Must is probably a strong word because there are many schools of thought regarding positioning the floats. However, the Fly Baby I had in mind while writing this article has been flown extensively with this set-up. The water conditions have ranged from glass smooth to white caps without failing to take-off. What makes conditions even tougher for take-off is that the airplane weighs 12 pounds which is slightly overweight. Adjust the float position until the measurements are satisfied for being parallel to the thrust line and the step below the C.G. The rear strut should rest on the wing bottom approximately where shown on the plans. Block and tape the floats solidly in this position. Place the fore-aft braces into position and use Hot Stuff to tack them into place. Wrap all the joints to be soldered with copper wire. Remove the floats and struts in one piece from the airplane. Then remove the struts from the floats. The Hot Stuff will hold everything in position. Solder all joints and clean all flux off thoroughly. The struts are now quite rigid, but for extra rigidity, install 1/16" cross braces between the struts as shown on the plans. As a last point regarding struts, be sure to have solid backing behind the holes for the rear strut mount on the wing. This part takes a lot of pressure in a full stop landing. When the plane rears back to stop, only the aft portion of the float remains in the water, transferring the majority of the pressure to the bottom of the wing via the rear strut.

If any taxiing on the water is to be done, a water rudder will be a definite asset. The one shown on the plans has served well for about eight years. It does not matter that the exact style shown be used, but do use the kick up feature which eliminates the problem of snagging weeds below the water line.

Many types of covering can be used. The

floats pictured were doped, covered with 3/4 ounce glass cloth and then doped some more. Any finishing method used to seal the wood and provide a tough skin will be adequate. Do not use any of the plastic iron-on coverings. They do not provide puncture resistance important for protecting the float bottoms.

At least, the floats are nearly finished. All that is left to make are the water rudder pushrods. Two pushrods are needed. One goes from the air rudder control horn to the control horn on the rear strut. The other one goes from the control horn on the strut to the water rudder tiller. The reason for two pushrods is to increase the length and, therefore, decrease the angle at which it pushes and pulls against the tiller. This provides a lot tighter control to the water rudder as opposed to hooking up directly from the air rudder to the water rudder. The pushrods are made of 1/4'' birch dowels with 1/16'' music wire epoxied into the ends. Quick Links and Z bends are used to attach the pushrods to the control horns.

The floats are finished. It would be easy to say, ''Now that wasn't so hard, was it,'' but they do require a fair amount of work. But you, who belong to a special breed of people, have endured the long haul knowing your reward will be glory only known to a ''float flier.'' You will know after the first successful flight that your labor has been worth it all. Happy splash and go's.

Fly Baby on Skiis:

Minnesota is called the ''Land of 10,000 lakes,'' but Minnesota is also the land of 10,000 flying sites. The lake that is used for float flying in the summer can also be used for ski flying in the winter.

It is not possible to fly off the fresh fluffy snow; no ski would be big enough. However, lake snow quickly becomes compacted or crusted enough to support a plane equipped with skis.

The same landing gear struts used with wheels will also support skiis if two small wire hooks are added to the main strut.

Cut each ski from 16'' x 4'' x 1/16'' ply. Boil the tip of the ski for three minutes. Boiling will soften the glue between the ply veneers so that the ply may be bent around a form such as a rolling pin. Use a thick towel to protect your hands from the hot ski.

With both hands, roll the tip of the hot ski around the rolling pin until the ski is slightly more curly than shown on the plans. Let the ski dry overnight and recheck the curl. If the curl is too much or not enough, boil it again and adjust the tip.

Apply several layers of contact cement to where the ski will be attached to the ski block and to the pine ski block. When dry, attach the ski to the block. We have found that contact cement works best because it retains resiliency in cold weather.

It is not necessary to paint or otherwise prepare the bottom of the skiis. Bare plywood works well.

Attach the ski blocks to the landing gear and secure them with wheel collars.

The rubber band holds the ski at a positive angle during flight. The fishline string prevents this angle from becoming too positive. On the snow, the plane must be able to rotate while the ski remains flat on the snow.

The tension on the rubberband must be strong enough to keep the tip at a positive angle in flight but loose enough to allow the ski to lay flat on the snow when the plane is at rest. Insufficient tension on the rubberband could cause the ski to rotate to a tip-down position in flight.

A ski for the tailwheel strut is not necessary. The tailwheel will act somwhat as a rudder in the snow; steering will be accomplished primarily with the air rudder anyway.

The prop wash combined with the skiis generate a swirl of snow behind the plane. In the bright sunlight of a mild winter day, this is indeed a pretty sight. □

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