LAKER

From the designer of the North Star, Laddie Mikulasko, is this super .40-.46 powered sport amphibian. Great for land and water.

Allow me to present to you a simple airplane which I hope will give you a lot of pleasure, flying from any surface.

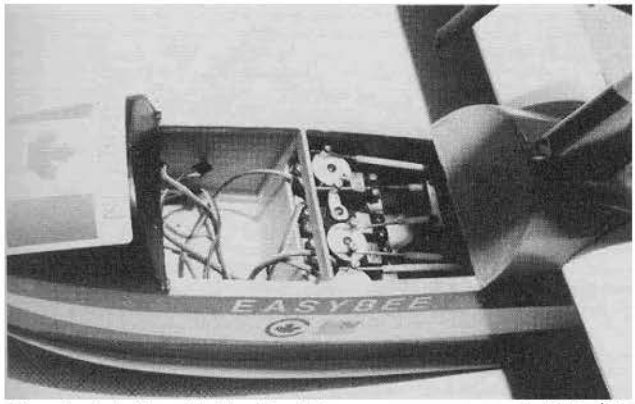
For me, designing a model like the Laker is a continuous challenge and fun.

Usually, a lot of ideas are in my head, for that **next** project. Laker is no exception.

During the last five or six years, I have built several flying boat type models. All of them flew well, but some of them had a hard time taking off, or building them wasn't the easiest thing.

For this model, I set three goals: Good flying characteristics, ease of construction, and good looks.

I made a new sketch, utilizing the wing design of the Easy-100 Trainer (RCM July '88). The fuselage shape was made as streamlined as possible. The engine was placed on a high pylon in tractor configuration for less hassle in balancing the model and a simpler arrangement for throttle control. The



Servo installation. Notice throttle servo arm connected to the nosegear steering arm to transfer movement up the post into the engine compartment. (Ball link used to connect servo to steering arm.)

The thrust angle of the engine can be changed slightly by adding washers behind the engine mount.

height of the pylon was made high enough to clear the canopy in the case of a 4-stroke engine and big prop.

The only thing I wasn't sure of was the amount of positive thrust angle to have on the engine. To be safe, I put in about 6° which I found to be too much on the test flight and I reduced it to 4°.

Initially, controlling the throttle posed a problem until I looked at the way a nose wheel is steered. This gave me an idea for transferring control from the servo to the engine inside the pylon.

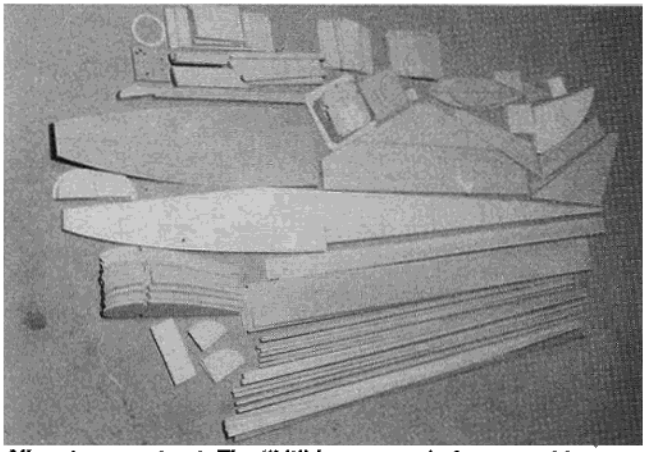
Sig lite ply was selected for the fuselage sides, to simplify building.

To minimize the problem of water getting into the fuselage, the only opening is under the canopy hatch, in front of the wing. The wing sits on a sealed, sheeted surface. At any time during taxiing or take-off, the radio compartment is well above the water line and all of the spray is kept under the wing. My Northstar (RCM March '86) had the same arrangement. Because of this set-up, the hatch does not have to be watertight.

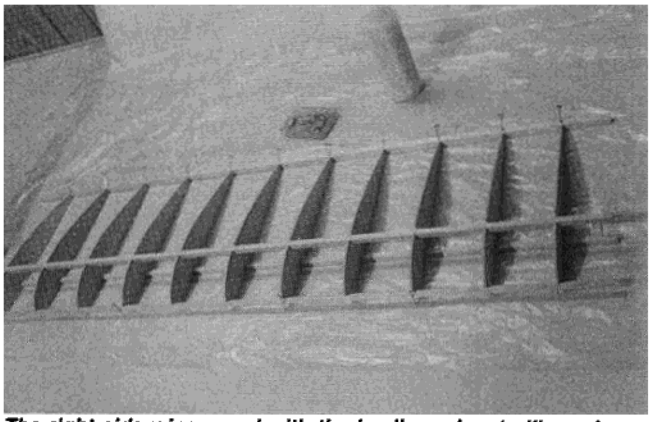
At rest, the stabilizer sits close to the water, but this has not posed any problem. Of course, NyRods have to be used for the elevator, rudder, and aileron controls.

Small sponsons are attached to the bottom of the wing. The model sits level on the water surface. I believe this to be the best arrangement for a sport type flying boat.

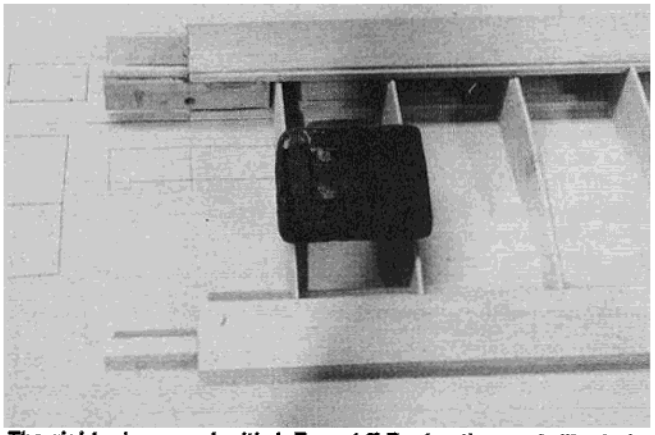
Over the years, I have observed too many flying boats with sponsons situated high above the water surface. Consequently, the craft leaned to one



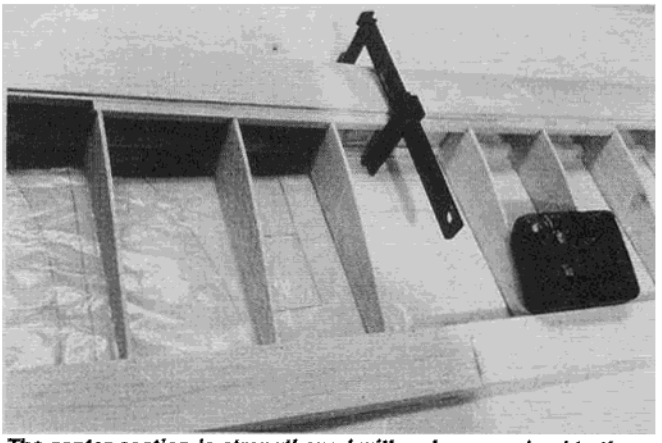
All parts are cut out. The "kit" is now ready for assembly.



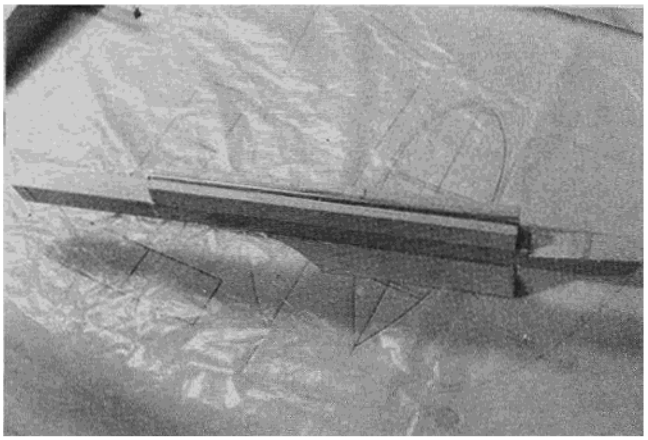
The right side wing panel with the leading edge, trailing edge, and spars glued in place.



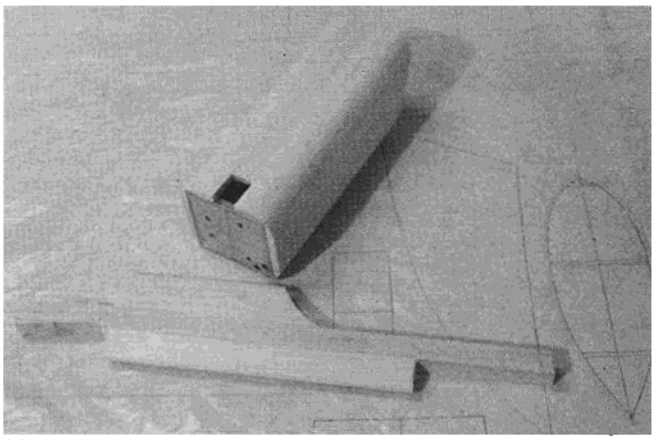
The right wing panel with L.E. and T.E. sheeting and dihedral braces installed. Ready for joining with the left panel.



The center section is strengthened with sub spars glued to the main spars (top and bottom).



Engine pylon posts are glued together. Note the aluminum tubing in place for the throttle operation.



The pylon has been rough shaped and is now ready for joining with the engine pod.

side while taxiing. Then, on take-off, these models would try to swing to the low side. The Laker, in contrast, is extremely easy to steer; first because it rides level and, second, because part of the main rudder is in the water all of the time.

Take-off is so uneventful it is almost boring. I can almost guarantee that if you build the model according to the plan, it will lift off in less than thirty feet.

Provisions were made for a removable tricycle landing gear because I wanted to do some hard surface flying as well.

I would recommend that you cut out most of the parts accurately ahead of time, and drill and cut out all holes where needed. For an experienced builder the plans and parts will fall together from here on.

Because I would like to see this model built by beginners as well, I will be describing individual building steps from here on with the aid of the numbers assigned to the individual pieces.

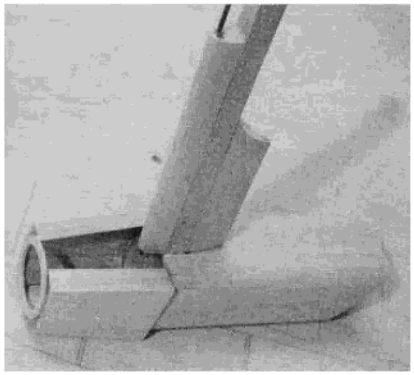
First off, cover the plans with a sheet of clear plastic so that you will be able to build your model on top of them without destroying the drawing.

CONSTRUCTION

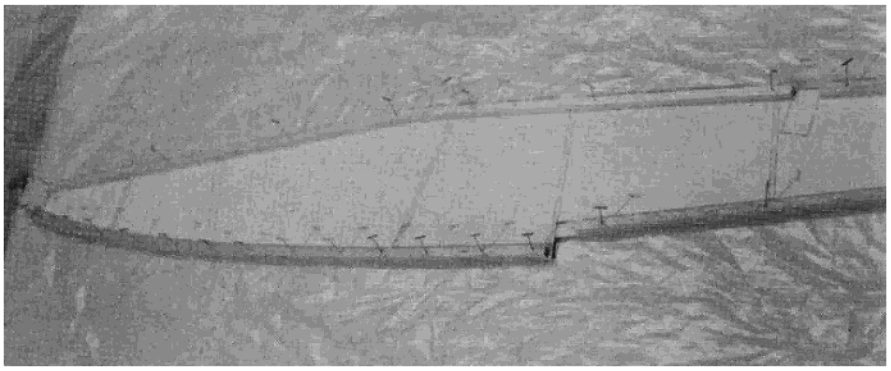
Wing:

The wing is built in two halves, to be joined later. Assemble it right on top of the plan.

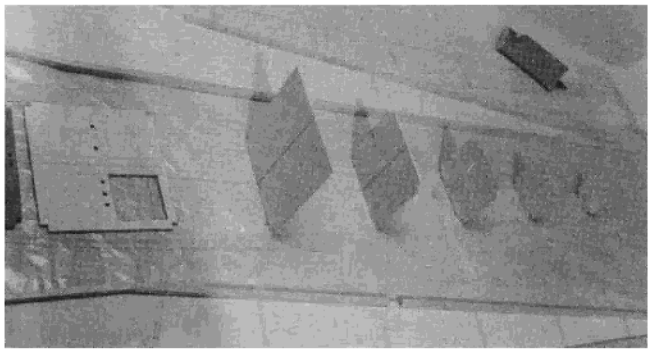
Pin the bottom spruce spar (2) and trailing edge (4) to the board. Glue in



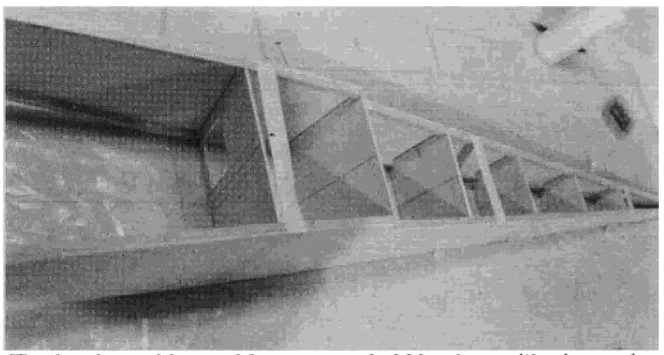
The engine cowling (nose pieces) are now added to the pod.



The fuselage side with former locations marked, and balsa longerons glued in place on inside.



The aft fuselage formers (behind F4) are all aligned with the centerline on the plans, and pinned in place. Note that all NyRod holes have already been drilled.



The fuselage sides and formers are held in place with pins and tape while the glue cures.

all of the ribs to these two spars, making sure that they are square with the building board surface.

Next, glue in the top spar (2) and leading edge (1).

Now, sand the top of the trailing edge stock to conform with the top of the ribs.

Glue on the top trailing edge sheeting (6) and leading edge sheeting (5). If the leading edge sheeting is hard to bend around the radius of the leading edge, dampen the outer surface with water.

Place weights on top of the wing while the glue is drying.

When dry, remove the wing panel from the building board and turn it upside down.

Glue on the bottom trailing edge sheeting (6) and leading edge sheeting (5).

Again, place weight on the panel while the glue is drying.

Now, place this panel aside and build the other half the same way.

With 5-minute epoxy, glue in the plywood dihedral brace (7) and doubler (8), along with dowel support (9).

At the trailing edge, glue in balsa filler (12).

To join the halves, place one panel over the plan and pin it to the building board.

After the glue has set, take the other panel and slide it onto the joining braces for a trial fit. If necessary, trim and shave for a good fit.

When satisfied, spread 5-minute epoxy over the joining braces and slide the wing panel onto them. Place a 1½" block under the tip of the panel and let the glue set.

Now, glue in the supporting spar (3), attaching it firmly to main spar (2), and ribs (W1).

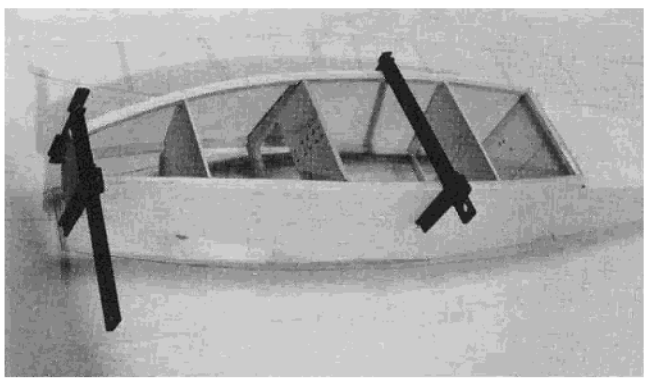
Sheet the center section of the wing (11) and glue on all of the rib capstrips (14).

Remove the wing from the building board. Glue on the bottom support spar (3).

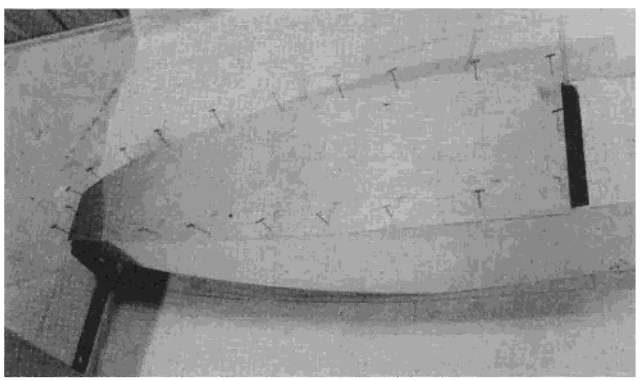
Now, glue on the bottom center sheeting (11) and sheeting (15) to support the sponsons.

Glue on the remaining capstrips (14).

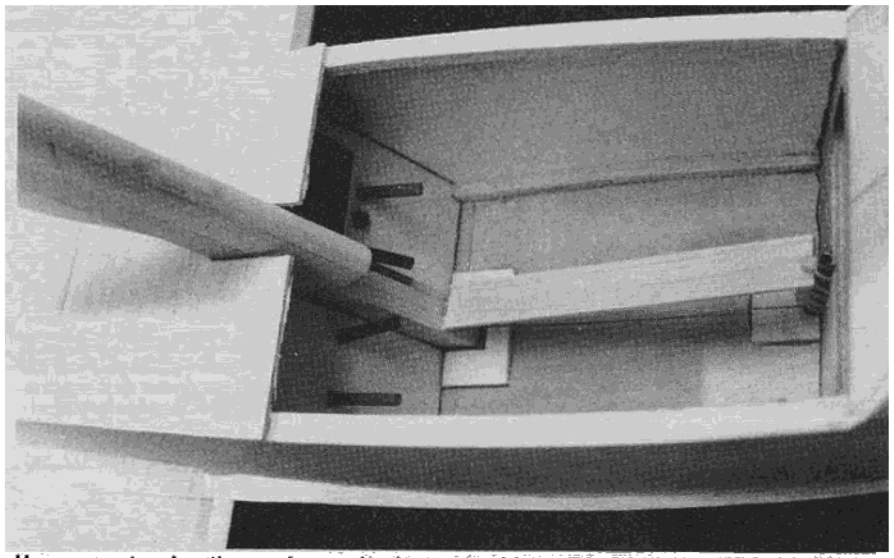
Glue on the wing tips (17) and their triangular supports (16) and (18).



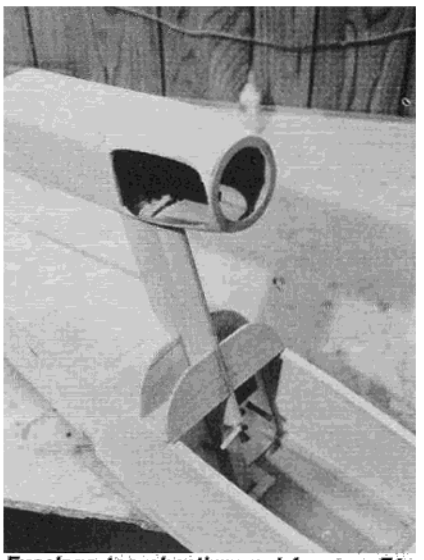
Securely clamp the fuselage sides at the front until the glue is thoroughly cured. Be sure to check for proper alignment.



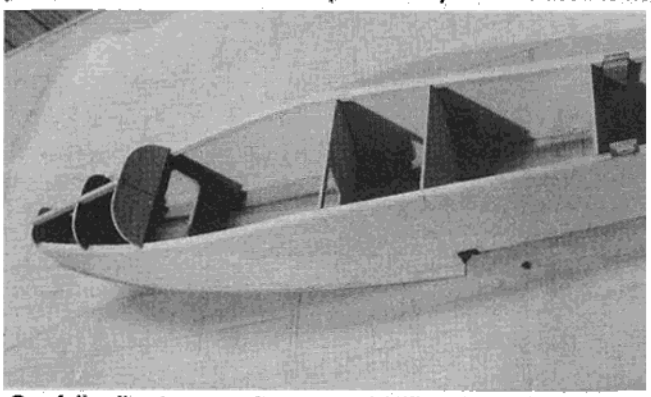
Glue plywood bottom in place on front of fuselage. Hold in place with pins, clamps, etc., until glue cures.



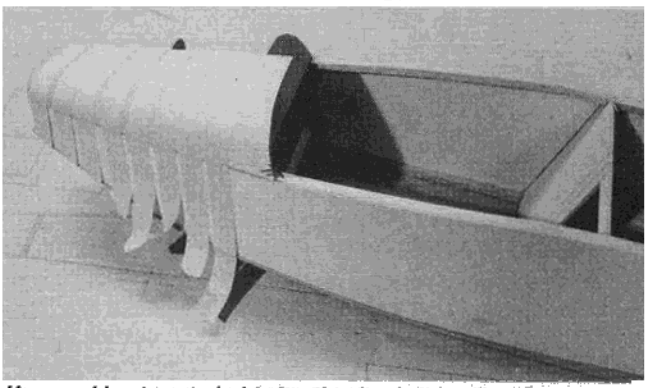
Use epoxy to glue the engine pod/pylon assembly to F4. Carefully align and hold in position until the cement cures. (Balsa scraps can be used to hold the pylon in place.)



Fuselage top sheeting and formers F4a and F4b glued in place.



Carefully align top nose formers and 1/4" sq. balsa, and glue in place.



Use masking tape to hold sheeting in place until cement cures. Note: Outer surface of balsa sheet can be moistened to help it conform to the shape of the formers.

Sand the wing to your satisfaction.

Next, glue on the plywood fairing plate (13) to the top sheeting of the center section of the wing.

Glue in the 1/4" hardwood dowel (10).

Cut out and sand the ailerons.

Engine Pylon:

First, cut the grooves in balsa block (39) and glue in aluminum tubing (40). To that, glue on the balsa leading edge strip (38) to cover the tubing. Glue the balsa block (39) to the main spruce post (29). To the rear of the post, glue on balsa block (44). Sand this post to a symmetrical airfoil, as shown in cut X-X.

Insert brass tubing (41) into the aluminum tube. Make sure that the length of this tubing is as shown in the side view.

For the engine pod, glue the triangular stock (57) to each engine pod side (58).

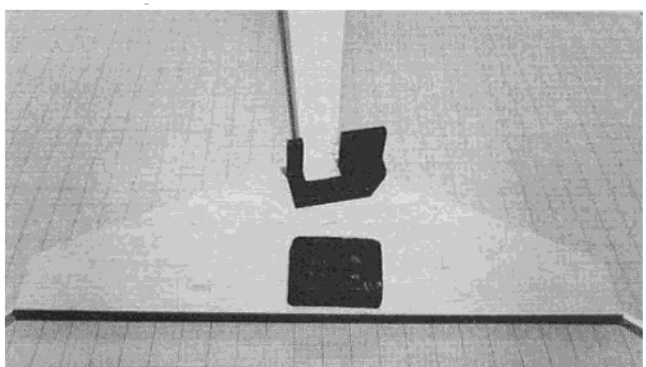
Glue in the firewall (55).

Glue on the top (56) and bottom (59) sheeting. In the bottom sheeting, cut out the square hole for the main post (29) to go through.

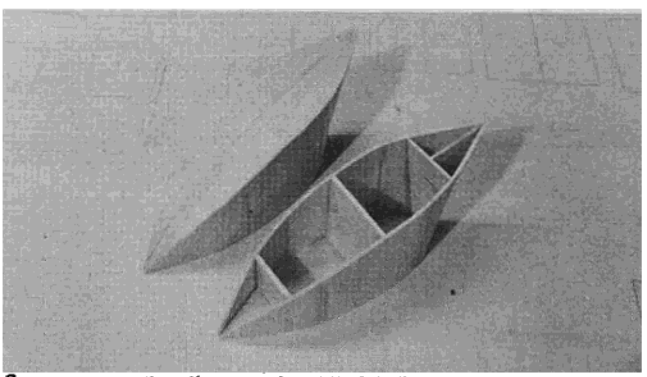
The next step should be gluing the main post to the firewall with 5-minute epoxy. Check the alignment before the glue sets.

To complete the engine pylon, you can make a fiberglass cowl or just continue carving the balsa version described below.

Glue triangular stock (53) to the sides (54) and glue on the top and



The stabilizer must be carefully aligned when glued in place on the fuselage. Weights can be used to ensure contact with the fuselage.



Sponson construction nearly completed.

bottom sheeting (52) to form a box.

Glue plywood ring (51) to the front. Now, glue this structure to the face of the firewall.

Round the corners so that the pod is tapered and streamlined.

Cut an opening in the side, so that the engine can be side mounted, since the throttle control linkage shown is for side mounted engines.

The engine pod and post are done; put it aside for now. If you want to use a larger fuel tank, you can enlarge the pod to suit.

Fuselage:

Before you start gluing, mark the location of all formers and bulkheads on the inside of the fuselage sides (26).

Glue on longerons (32) to each side.

The fuselage is going to be built upside down over the plan.

Glue all rear formers, up to (F4), between the fuselage sides, making sure that the centerline of each former is aligned with the centerline on the plan. Former F4 is glued with 5-minute epoxy. Care should be taken to that the sloping angle of this former is correct since it is important to the engine thrust angle.

Before you glue in former (F3), attach the brass tubing (34) to it for the steerable nose gear. You can use strong thread or tie-wraps to hold it in place.

Now, with 5-minute epoxy, glue in formers (F1, 2, and 3). Again, check the alignment before set.

Behind the step, glue on the bottom sheeting (45).

Glue in the main landing gear blocks (48 and 49).

In the front, glue on the plywood bottom (27).

Now, you can remove the fuselage from the building board.

Glue in 1/4" x 1/4" balsa support (30) to former (F4) and the fuselage side.

Glue in the hardwood blocks (47) for the wing bolts.

Install the NyRods for elevator, rudder, and ailerons. Where the Nyrods exit, seal the area with epoxy. One NyRod is installed to house the receiver antenna.

Attach the engine pod to the fuselage by gluing the main post (29) to former (F4). Spend extra time aligning the post with the fuselage. Try to keep the angles close to the plan.

Now, glue on the fuselage top sheeting (46).

On both sides of the post, glue on half-formers (F4b) in front and (F4a) in rear.

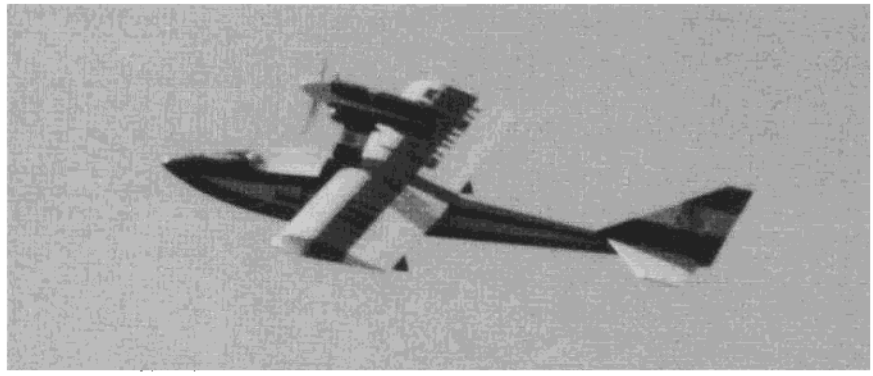
Glue on balsa sheeting (60). Let this sheeting overhang former (F4a), so that it can be trimmed to the contour of the wing's leading edge later on.

At the front, glue on top former

LAKER
Designed By:
Laddie Mikulasko
TYPE AIRCRAFT
Amphibian Sport Plane
WINGSPAN
70 Inches
WING CHORD
11⅝ Inches
TOTAL WING AREA
813¾ Sq. In.
WING LOCATION
Shoulder
AIRFOIL
Clark Y Modified
WING PLANFORM
Constant Chord
DIHEDRAL EACH TIP
3/4 Inch
O.A. FUSELAGE LENGTH
59 Inches
RADIO COMPARTMENT SIZE
(L) 11" x (W) 5" x (H) 4"
STABILIZER SPAN
22 Inches
STABILIZER CHORD (incl. elev.)
7 Inches (Avg.)
STABILIZER AREA
154 Sq. In.
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
8 Inches
VERTICAL FIN WIDTH (incl. rud.)
6 Inches (Avg.)
REC. ENGINE SIZE
.40-.46 2-stroke
FUEL TANK SIZE
8-10 Oz.
LANDING GEAR
Tricycle (removable)
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Ail., Throt.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Lite Ply & Balsa
Wing	Balsa & Spruce
Empennage	Balsa
Wt. Ready To Fly	96-100 Oz.
Wing Loading	17.8 Oz./Sq. Ft.



Lift off accomplished in less than 25 feet.

(F3a) to former (F3) and top longeron (35).

Glue top sheeting (37) onto the nose section and glue on nose block (36).

Sand the fuselage.

Glue on the stabilizer (20) and the fin (23).

Glue on triangular stock (22) for extra support of the fin.

The radio compartment canopy hatch can be made now.

Cut balsa sheeting (63) to the outside contour of the fuselage.

Glue on 1/4" x 1/4" balsa edge to this sheeting and glue on former (64) in front along with (61) in the rear.

To keep the hatch in place, drill a 1/8" dia. hole right through formers (F4b) and (61). Notice that it is offset to clear the aluminum tubing.

Glue in a short dowel in the hole in former (F4b). I have an aluminum clip holding it in place in front.

You can finish this hatch two ways: One is by simply gluing on a windshield at the front; or you can glue on a homemade canopy to this frame. The alternative is to square off formers (F1, 2, 3, 4a, and 4b), box them in with 1/8" sheeting and 1/2" triangular stock, and round the resulting box section to the contour of the rest of the fuselage.

Mate the wing to the fuselage by trimming the sheeting (60) so that it follows the contour of the leading edge until the dowel in the wing touches the post (29).

Mark the center point of the dowel on the post and carefully drill a 1/4" dia. hole approximately 1/4" deep into the post.

Align the wing with the fuselage and drill two holes in the plywood fairing (13) to go into the fuselage hardwood blocks (47) for the wing bolts.

Sponsons:

Pin the sheeting (66) to the building board and glue formers (68, 69, 70, and 71) to it.

Next, glue on side sheeting (65) and then bottom (67).

Sand to your satisfaction, but keep the bottom edges sharp. Do not glue them to the wing yet.

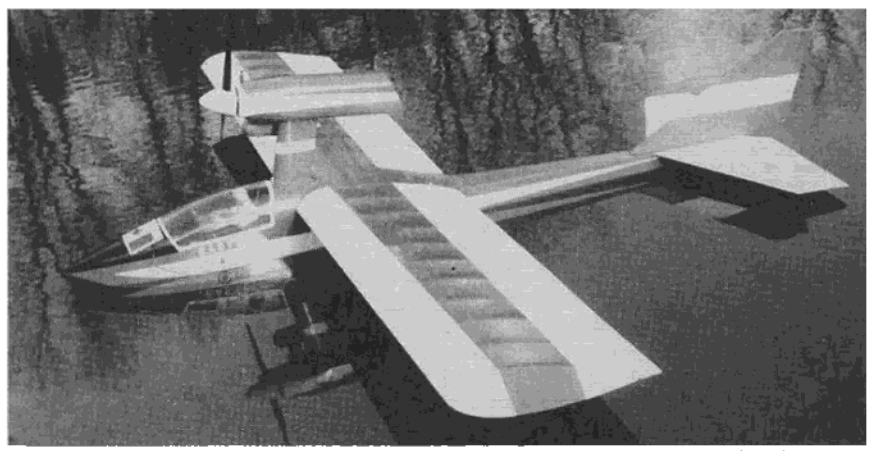
Finishing:

There are many ways to finish the model. Since this model will be in contact with water, you should be using some kind of fabric for covering.

I decided to finish my model the following way:

I gave the whole model one coat of clear dope and sanded it lightly. Any light filling should be done now. I covered my wing with Sig Koverall fabric. The fuselage and tail surfaces were left uncovered.

One coat of clear dope was applied to



Notice how level the model sits on the surface. The sponsons are just touching the water.

the wing. Then, a coat of Balsarite, thinned 50-50, was brushed onto the entire model and sanded lightly.

I then covered the entire model with an iron-on plastic film from Balsa USA, called Aerospan. Any low temperature covering can be used equally well.

The sponsons were covered the same way. Now, the sponsons are glued to the underside of the wing.

Usually, I install all of my control surface hinges now.

Install the control surfaces, engine, fuel tank, radio, etc.

Connect the throttle servo to the steerable arm at the bottom of the post (use a ball-link on this arm).

At the top, inside the engine compartment, connect the engine throttle arm to the steerable arm. Check the operation of this linkage for smoothness and play.

Connect all other controls and set the throws.

The elevator should have 1/2" to 5/8" throw up and down. The rudder should be 1" left and right, and the ailerons should be between 3/8" to 1/2" both ways.

Check the Center of Gravity. If you need to, move the battery behind former (F4). This former has a hole in it for this purpose.

The receiver antenna is pushed into the NyRod in the fuselage.

The model is now ready for flight.

Flying:

Set your engine so that it idles reliably.

Check all of the controls and, if satisfied, put the model onto the water surface and taxi out into the wind.

Open the throttle wide and in no time the model should be airborne.

In the air the model is stable and should fly level at all throttle settings. If you find that the model climbs with the elevator in neutral, you have too much up-thrust on the engine. If you have to use "up" elevator to fly level, then most likely the engine has too much down-thrust.

Even if the thrust line is off a couple of degrees either way, nothing catastrophic is going to happen. Adjustment is a simple case of adding washers or spacers behind the engine mount.

The model is fast and aerobatic when flying wide open. Landing speed is ridiculously low.

If you want to fly from a hard surface, just mount the main landing gear and slip the nose gear into the brass tubing, connecting it to the rudder servo.

I think that you will be happy flying the Laker on the water, on snow, or off a runway.

Happy flying. □

From RCModeler Sep. 1989