BY P.H. FIRMAN

PHOTOS BY K. INGLE

A realistic, semi-scale classical biplane that is pretty in the air, steadier in the wind than the average monoplane, and fully aerobatic with a .35 to .61. The approach and landings are a dream - - - if you can't land this one, you'll never land anything!

RODEO

Do you feel like a change from the usual aerobatic low wing monoplane? Are you apprehensive of the time and effort involved in building that scale model you've always promised yourself — and, even if you did build it, would it be "too good" for weekend flying sessions?

Do you like your models to look like full size airplanes? Above all, **do you like biplanes?** Then, why not get some romance into your aviation with a vintage bipe, particularly the open radial motor, "golden age" type airplane of the 1930's — that exciting era in aviation history.

"Rodeo" offers you a fairly simple to build, yet realistic semi-scale model, based on the lines of these classic American biplanes. Pretty in the air, delightful to handle, and fully aerobatic when called upon, it requires only moderate power (think of the fuel economy) — the prototype performing very adequately on a good .35 (Merco). Nevertheless, the model is large enough to handle a .61 should you really want to tear the strip up.

The take-off is very straight and easy, in fact, the pilot is hardly involved. "Rodeo" just looks after herself. (I know you have heard this one before, but this time it's true!)

The approach and landings are really a dream — if you can't put this one down, you'll never land anything! You can haul it back with a little steam on and she will sit down, in a light breeze, with virtually no forward speed at all. One of the features of "Rodeo" is its resistance to tip stalling. I wouldn't say it couldn't tip stall, but we've tried, and we **can't!** There is nothing fancy about the wing design, the airfoil section is NACA 2412 throughout, with the top and bottom wings at the same incidence, with no washout. And don't let anybody kid you that biplanes are tricky to fly in a wind, those who know will tell you that they are probably steadier in a wind than the average monoplane.

Having now come to the end of the commercial, let's have a look at the construction. In general, "Rodeo" is of all sheet construction, with cantilever bolt-on wings of balsa covered foam. The structure is conventional and simple, and designed to use medium and soft stock. The selection of light wood for the sheet components is important, especially for the rear half of the fuselage, and covering of the tail surfaces,

in order to maintain the correct CG position — particularly with the smaller, lighter, motors.

Note the top wing bolt-on system. This, I think, is as neat as most, and has proved very serviceable, ensuring an accurate line-up every time the wing is fitted.

FUSELAGE

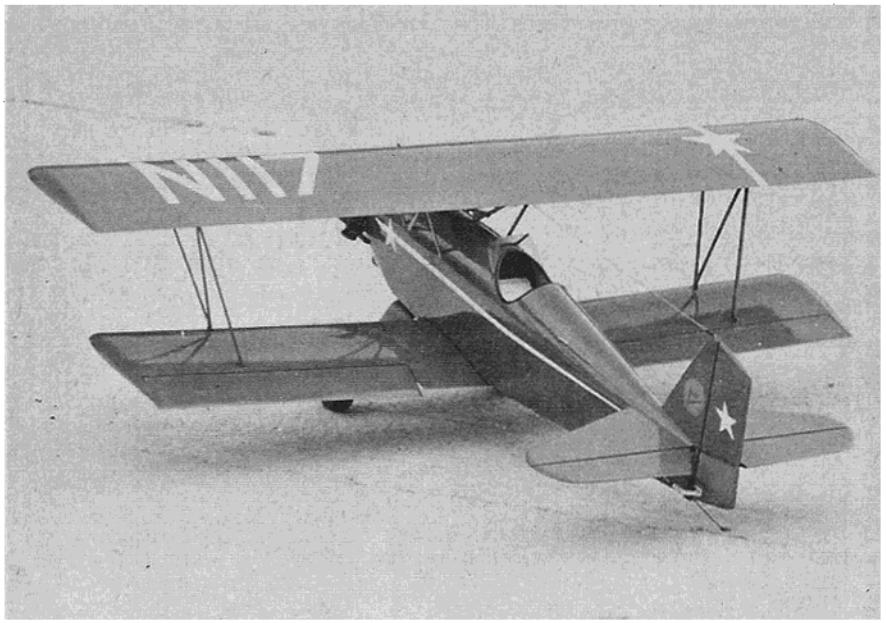
The basic sides are cut from medium sheet, with the balsa doubler, ply tripler, and longerons and vertical spacers pre-assembled to the sides. Mark off the positions of the bulkheads on the insides, using a soft pencil. At this stage the 1/4'' square vertical spacer at the lower wing position and the 1/2'' x 1/8'' spacer at the T.E. position are fitted. (Note that the latter is notched over the doubler and longeron.)

The firewall and bulkheads are cut from plywood. Adjust the size and position of the fuel tank cutouts in F-1 and F-2 to suit installation, if necessary. Drill F-1 for the bearer bolts. Omitting at this stage the F-2 bulkhead, join the two sides with F-1 and F-3, the 1/8'' square spacers at the rear, and the 1/2'' x 1/8'' spacers at the cockpit position.

The next task, before proceeding further with the fuselage, is to bend up the center section struts CS-1, 2, and 3 from 3/32'' piano wire, forming them as accurately as you can. Tack glue CS-1 to bulkhead F-2, aligning as truly as possible. Fit F-2, complete with strut, between the fuselage sides, again checking the strut for squareness and height. The rear strut CS-3 can now be tack glued to the 1/4'' square spacer at F-3, checking the alignment with the front strut, and noting that the height to the tops of both sets of struts are the same, measured from the top edges of the fuselage sides. Fit the diagonal struts CS-2 (2-off), tack glued to the aft face of F-2, and binding with wire, ready for soldering, to the top of CS-3. Check and adjust as required, noting that the struts are vertical when viewed from the side. When satisfied with the line up, solder CS-2 to CS-3, and bind and epoxy the strut assembly to bulkheads F-2 and F-3, using heavy thread and plenty of glue. Fit the hardwood gussets at F-2 and cut out and fit deck formers F-3A to F-9, and finally the top stringer. The center section brace wire ply reinforcing and aluminum bracket is fitted at F-3A, and the longeron doublers at the cockpit opening.

We now come to the curved decking. This is achieved by selecting soft, flexible sheet, and cutting to a rough oversize shape, one half at a time, from the fuselage side to the top stringer. Apply a liberal coat of clear shrinking dope to the inside of the panel, and water soak the outside surface, causing the sheet to curl. While still wet, and after persuading to shape with the fingers, pin and tape to the fuselage to dry out. When dry, remove from the fuselage, trim to shape, and glue back into position. Leave cutouts around the struts in the forward decking and fill with scrap on completion.

The 1/4'' ply lower wing front dowel locating plate is fitted, with its ply gussets, followed by the ply landing gear plates,



hardwood blocks and the balsa corner filler. Install the ply tank floor.

The engine bearer bolts, etc., tank, and fuel lines are more easily fitted at this stage Use blind nuts or captive bolts to attach the bearers to allow for bearer removal and adjustment.

The top and bottom of the fuselage forward of the struts and landing gear is built up of 1/2'' sheet and triangular stock in the usual manner, carved and sanded to the sections shown, with the detachable and fixed cowls of 1/2'' sheet and block.

RODEO

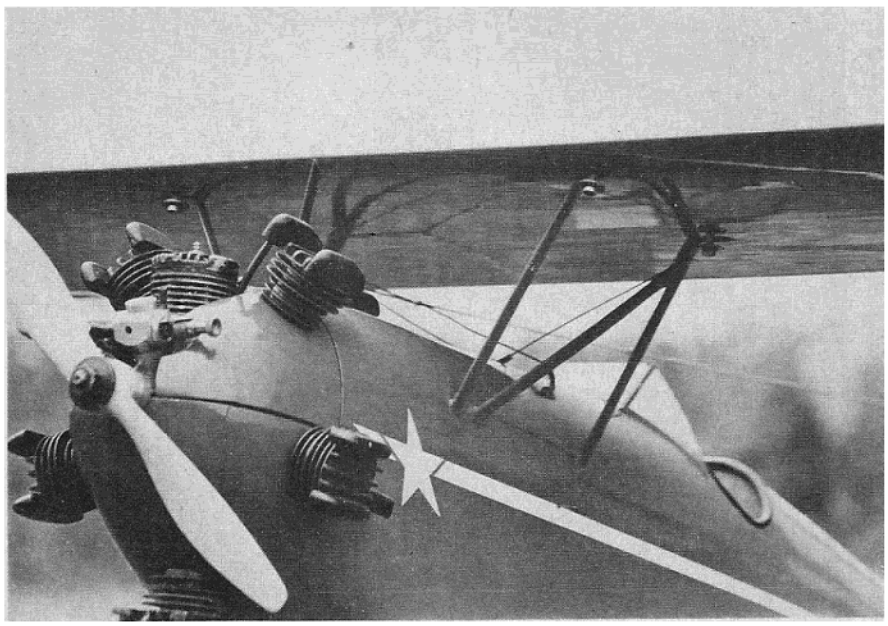
Designed By: P.H. Firman

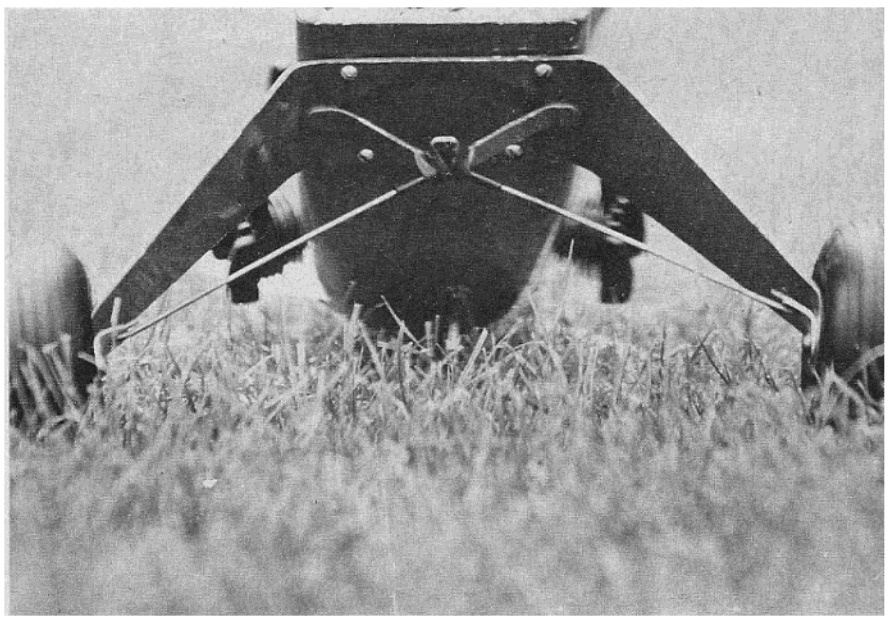
TYPE AIRCRAFT
Sport Biplane
WINGSPAN
52 Inches
WING CHORD
8½ Inches
TOTAL WING AREA
835 Square Inches
WING LOCATION
Biplane
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
1'' Lower Wing Only
O.A. FUSELAGE LENGTH
40½ Inches
RADIO COMPARTMENT AREA
(L) 14¾'' X (W) 3½'' X (H) 3½''
STABILIZER SPAN
19¾ Inches
STABILIZER CHORD (incl. elev.)
6 Inches (average)
STABILIZER AREA
116 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top Of Fuselage
VERTICAL FIN HEIGHT
6 Inches
VERTICAL FIN WIDTH (incl. rudder)
6 Inches (average)
REC. ENGINE SIZE
.35-.61 Cubic Inch
FUEL TANK SIZE
6-8 Ounces
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rudder, Elevator, Ailerons, Throttle
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa and Ply
Wing	Foam Core w/Balsa Sht., and Ply Braces
Empennage	Balsa w/Ply Inserts
Weight Ready-To-Fly	80 Ounces
Wing Loading	13.8 Oz./Sq. Ft.

At this stage the top tail cone block is tack glued in position and shaped, then removed, to be re-fitted after the tail unit is assembled to the fuselage. Now, fit former F-10.

To complete the fuselage, fit the 1/32'' music wire center section brace wire with its clip bolted to the top stringer, and the top





ends wrapped and soldered to the tops of struts CS-3. Attach the strut fairings, fairing them into the fuselage decking, and fit the bottom fuselage sheeting, not forgetting the horizontal stabilizer incidence "wedges." (The rear end of the fuselage is left open to receive the fin.)

EMPENNAGE

Simply constructed and covered with light 1/16" sheet, the horizontal stabilizer, complete with elevator, is assembled to the fuselage, followed by the fin and rudder. The leading edge of the fin passes through the stabilizer and locates in former F-10. The tail skid tube is epoxied to the fin post. Re-fit the tail cone block after slotting for the fin and cutting away for the stabilizer.

DUMMY MOTOR

The dummy 5 cylinder radial, built on the "stacked washer" system, is self explanatory in construction. Fill the grain with sanding sealer and finish with black paint with a little silver added, plus a coat of semi-matte fuel proofer. The fuselage is now ready for sanding and finishing.

WINGS

The foam wings, with 1/32" balsa covering, are light and very strong. The top wing cores are joined at the center as shown on the plan — it can be cut in one piece of course, if you can manage it. When sheeting the wings, pre-join the sheets in one piece for each surface and with the top wing, keep the chord wise joints away from the center and towards the tips, i.e., use two 48" x 4" sheets with approximately 1" wide scrap extension at the tips (see plan). The false leading and trailing edges and wing tip blocks are added after the sheeting.

Now let's deal with this top wing mounting. As you can see, the wing is held by bolts and washers clamping the horizontal tops of the center section struts into the flush slots in the underside of the wing.

To fit the mountings, the 1/32" ply webs WM-3 are slotted edgewise into the completed wing and the foam core and balsa skin between them removed sufficiently to accept the strut mounting plates WM-1 & 2. The pre-assembled mounting plates, comprising the long 1/16" ply plates WM-2, blocks, blind nuts and slotted plates WM-1, are then fitted between the webs WM-3. Note that the plates WM-1 are flush with the wing surface. Fill the recess left by WM-2 with 1/16" sheet. Drill a hole in the rear plates to receive the projections of the tops of the diagonal center section struts, and check that the struts are a fairly tight fit in the slotted plates. Use epoxy glue throughout the wing mounting.

The bottom wing halves are sheeted before joining. Bevel the root ends to match the dihedral and cut slots for the braces LW-1 & 2 through the core and skin. Glue together and sand the braces flush with the skin when dry.

The ailerons, after marking out and separating from the wing, are assembled complete with torque rods to the wing, cutting a slot for the torque rod, and filling with scrap 1/16" sheet when in position. (You can either make up rods as shown or use a commercial equivalent.) Do not omit the root bearing plate. Fiberglass tape the root joint after fitting the front dowel and rear bolt block.

The balsa packing block, fitted under the ply wing bolt plate in the fuselage is adjusted in thickness so that it just touches the top of the bolt block in the bottom wing. This is to prevent the plate bending when the nylon bolt is tightened.

The ply and balsa laminated interplane struts are attached to the ply lugs in the wings with copper wire loops with the ends of the loops crossed to retain them. (When dis-assembling the model, the struts can be left attached to the bottom wing.)

LANDING GEAR

Use hard dural for the legs and cross wire bracket and form with a fairly generous bend radius (about 3/16" inside radius) to avoid cracking at the bends. The 1/16" piano wire cross brace is rubber lashed to the center bracket to provide springing.

With the Rawlnut attachment, the gear can be removed easily for adjustment (and for straightening it!) Make sure the Rawlnut screws are tight securing the rubber mounted nuts in the ply mounting plate.

MOTOR INSTALLATION AND COWLING

The motor installation is straightforward; hollow out the lower cowl to suit the motor and bearers. Note the down and side thrust packing between the bearers and F-1. The top detachable cowl is cut away to clear the motor — on the right side it is cut below the exhaust stack. Fit a stack extension to enable the muffler to clear the fuselage side. Fit the hold-down bracket to the firewall and the location dowels in the fixed cowl. Fiberglass the inside of the cowls for strength.

RADIO INSTALLATION

The receiver and batteries are installed well forward, packed in foam **rubber,** with the on-off switch somewhere on the left side, or in the cockpit, away from the exhaust. The servos in the fuselage can be mounted on a ply plate as shown, or in any way you may prefer — there is plenty of room available. Leave the final positioning of the servos until the model is complete to adjust for the correct C.G. location.

Pushrods are either commercial ones or made up of hard 1/4" square balsa with your favorite end fittings, etc.

The aileron servo is fitted to the bottom wing in the usual way with adjustable links to the torque rods. A point to watch here is that the aileron servo and linkage does not foul the other servos when the wing is fitted.

Control surface movements, on the original, were: elevator, 1/2"; rudder, 1"; ailerons, 9/16" each way at the trailing edges.

FINISHING

Whatever finishing method you use it is well worth spending a day cleaning up and sanding the structure.

The prototype "Rodeo" is finished in the traditional manner, with doped-on "Modelspan" (English equivalent of "Silkspan"), filled with 3-4 coats of sanding sealer, sanded down between coats. The top paint finish is 2 coats of polyurethane — scarlet with white trim.

If you carry out a MonoKote job, don't forget to seal the edges in the nose area with clear fuel proofer.

It's just a passing thought that this model would be good in an Army Air Corps olive drab and chrome yellow scheme.

The model should weigh about 80 ounces. It could run up to 6 lbs. with the .61 motors, but don't forget the lighter it is the better it will fly and more likely to survive the minor bumps and heavy landings than the heavier "bombs."

FLYING

Having dealt with the flight performance earlier, I would just like to mention one or two points on flying biplanes in general.

First, although "Rodeo" is an easy model to fly it is assumed that you have had some experience in driving a low wing multi around, as this is not really a raw beginners airplane.

Biplanes are somewhat quicker in roll to the left than the right due to motor torque than are monoplanes, and they glide more steeply because of the extra drag of the two wings and struts, etc.

You can't stretch out the dead stick approach in the same way as pattern monoplanes can — not that this is any disadvantage.

One important point is, of course, never to attempt to fly with the C.G. aft of the position shown on the plans. A little forward — up to an inch, say — is okay. All you lose is a bit of maneuverability — the other way you stand to lose the ship!

Well, there it is. This is one model you'll not regret building and if you've not flown a bipe before you'll kick yourself for all the fun you've missed.

The only problem you may find is that everybody on the strip will want to fly it. Just tell them (nicely) to build their own!

Have fun, fly safely. □

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