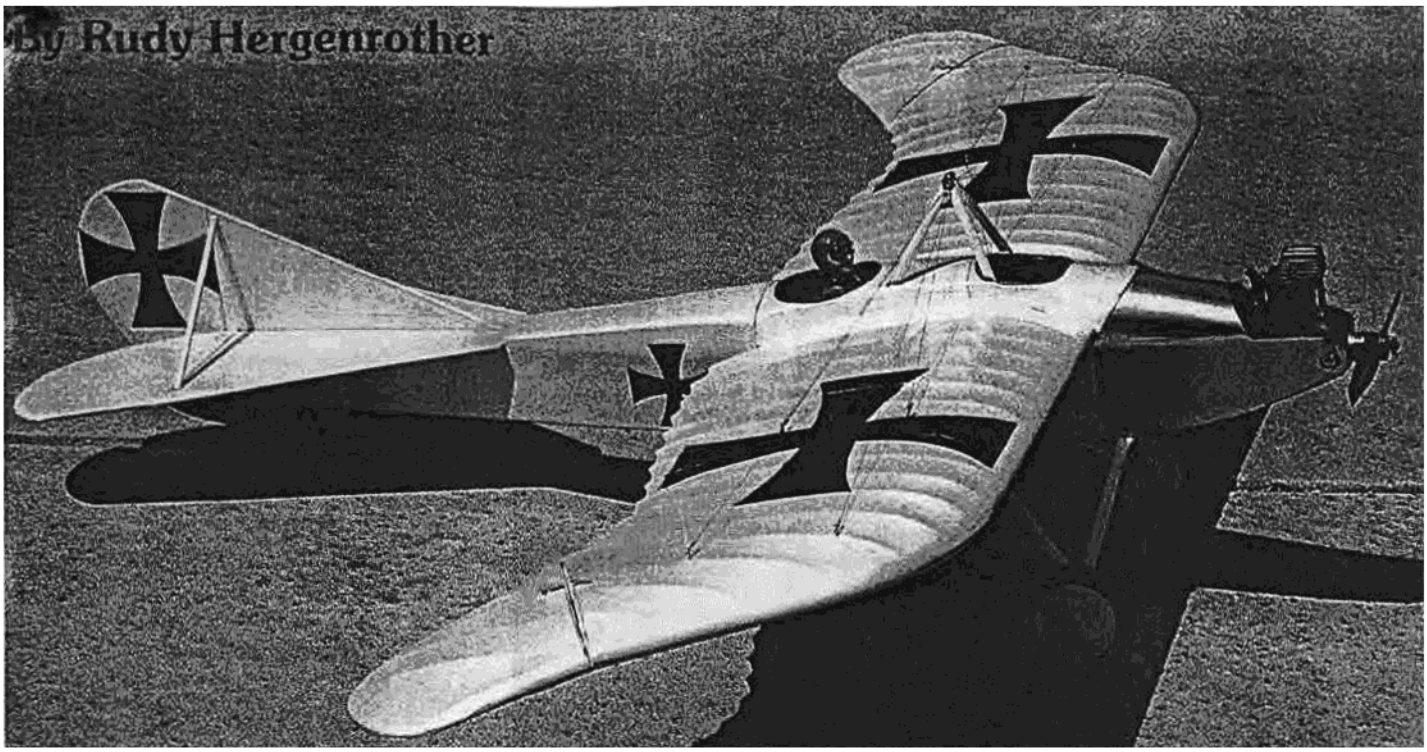


By Rudy Hergenrother

FIVE O'CLOCK TAUBE

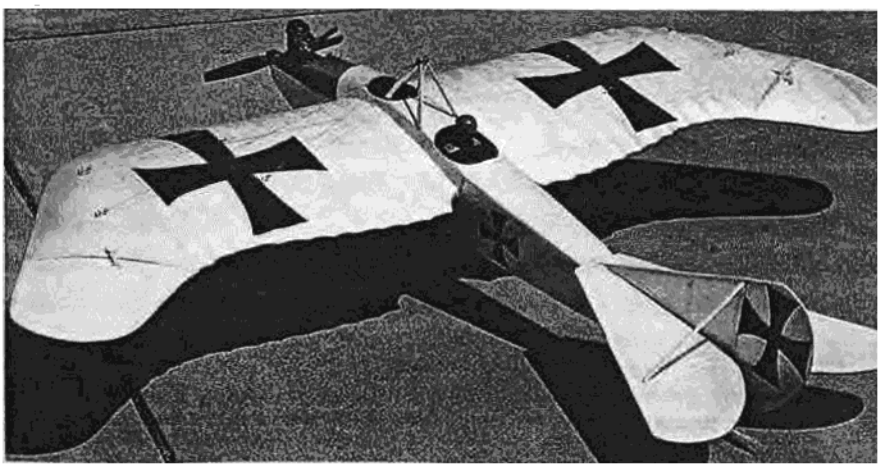
A Unique .40 Powered WW I Aircraft That Makes A Great Sport Flier

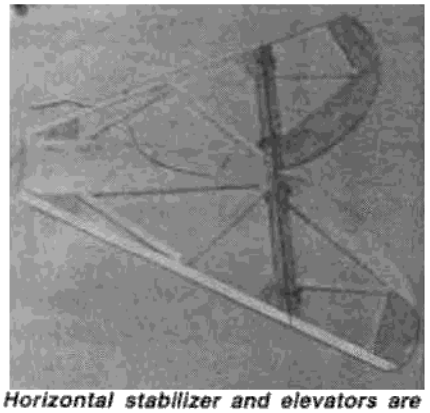
On August 30, 1914, less than one month after the start of World War I, Lt. Ferdinand von Hiddesson flew his Rumpler 4C "Taube" over Paris, in the late afternoon, dropping three 7 lb. bombs and three weighted messages urging Parisians to surrender their city to the German invaders. These attacks continued regularly in the late afternoon attracting a large audience who turned out to have an afternoon drink while watching the "Five O'Clock Taube" fly over their city.

The original Taube design, developed by Igo Etrich in Austria, first flew successfully in 1910. The Taube wing shape was based on the Zanonia seed of Java which displayed excellent stability in gliding flight. Etrich's experimentation with a series of full-size gliders, flown as early as 1904, led to the 1910 design. Taubes became popular in Europe, as both civilian and military aircraft, during the four years preceding World War I. In 1910, the German firm of Rumpler gained a license from Etrich to manufacture the Taube design. Many other manufactures also built derivatives of the Taube design during this same period. By 1914, Rumpler improved on the basic design to develop the 4C, which was built to military specifications for numerous roles including flight training, observation, communications, and bombing.

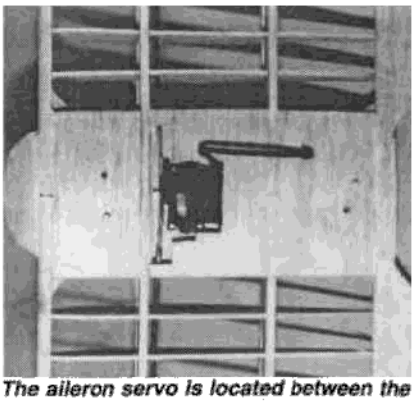
The 4C differed from the original Etrich design in having a more conventional tail layout, much less wire rigging, a simpler landing gear and large ailerons, making it a much cleaner design that is easier to develop into a stand-off scale model aircraft.

Nine years ago, I built a Balsa USA Taube, powered by an O.S. 40 4-stroke engine, which I have been flying ever since. The kit was very inexpensive and simple to build. The design was based on the original Etrich design of 1910. The model has delightful flying characteristics and is easy to fly. Six years ago, I was able to get a good 3-view of the Rumpler 4C Taube through correspondence with Col. John A. de Vries and Richard M. Zasadney. I developed the 4C design using the Balsa USA kit as a basis, employing many of its precut structural parts. The resulting design has an entirely different tail, a modified landing gear, and fuselage, and a wing which employs a modified airfoil and ailerons. The tail control surfaces of the 4C were much larger than that of the Etrich, improving low speed maneuverability. As a result, the flight characteristics of the 4C showed an improvement over the original Balsa USA model in the areas of inverted flight, outside maneuvers, speed range, rolls, and spins. Although I like a model with scale-like appearance, I enjoy doing maneuvers beyond the capability of the full-scale aircraft. The model can do slow and snap rolls; inside, outside, and square loops; split S, tail slides; spins; Immelmanns, hammerhead stalls; horizontal, vertical, and Cuban eights; as well as inverted flight. To achieve this

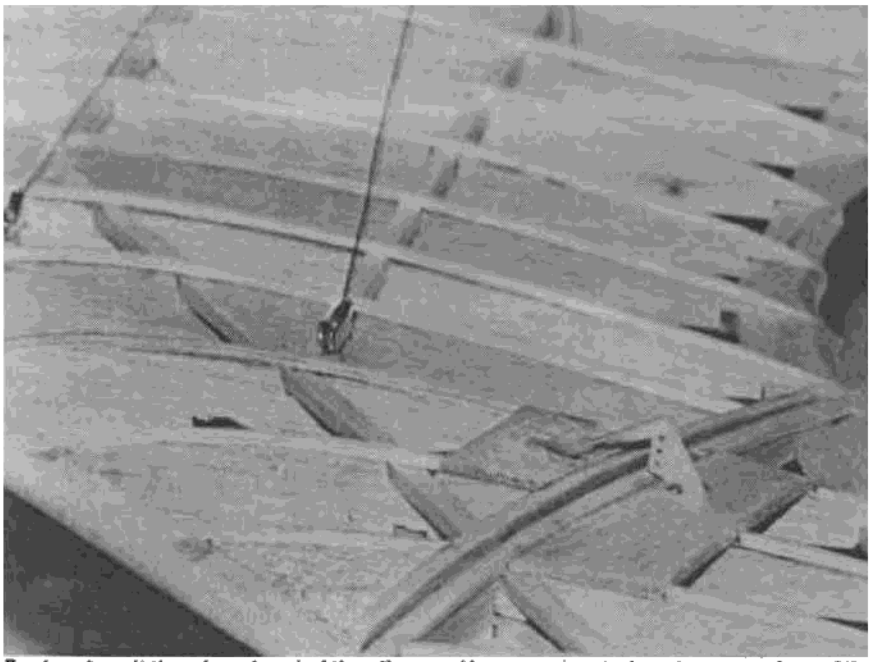




Horizontal stabilizer and elevators are built-up using 3/16" balsa.



The aileron servo is located between the spars, and drives NyRod pushrods out to the ailerons.



Pushrods exit the wing ahead of the ailerons. Horns are located on the top surface of the ailerons. Flying wires are attached to small screw eyes on the wing.

RUMPLER 4C TAUBE

Designed By:
Rudy Hergenrother
TYPE AIRCRAFT
Sport Scale (⅛)
WINGSPAN
62 Inches
WING CHORD
10 Inches (Avg.)
TOTAL WING AREA
650 Sq. In. (Approx.)
WING LOCATION
Shoulder Wing
AIRFOIL
14.5% Semi-symmetrical
WING PLANFORM
Swept
DIHEDRAL, EACH TIP
¾ Inches
OVERALL FUSELAGE LENGTH
43 Inches
RADIO COMPARTMENT SIZE
(L) 11" x (W) 3" x (H) 3"
STABILIZER SPAN
17½ Inches
STABILIZER CHORD (incl. elev.)
7 Inches (Avg.)
STABILIZER AREA
120 Sq. In. (Approx.)
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
5¼ Inches
VERTICAL FIN WIDTH (incl. rud.)
9½ Inches (Avg.)
REC. ENGINE SIZE
.40 4-stroke
FUEL TANK SIZE
4 Oz.
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4-5
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail.
Bomb Drop
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa & Ply
Wing ..... Balsa & Ply
Empennage ..... Balsa
WL Ready To Fly .. 68 Ozs. (4 Lbs. 4 Ozs.)
Wing Loading ..... 15 Oz./Sq. Ft.

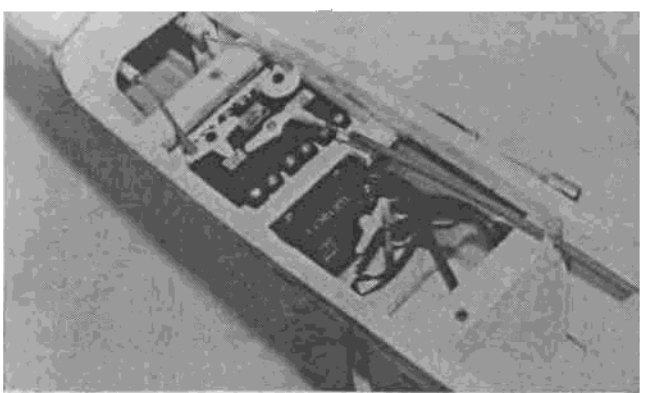
performance, the model was designed to be strong and yet light. This was accomplished, in part, by using good quality light balsa wood and covering the model with Coverite's Micafilm.

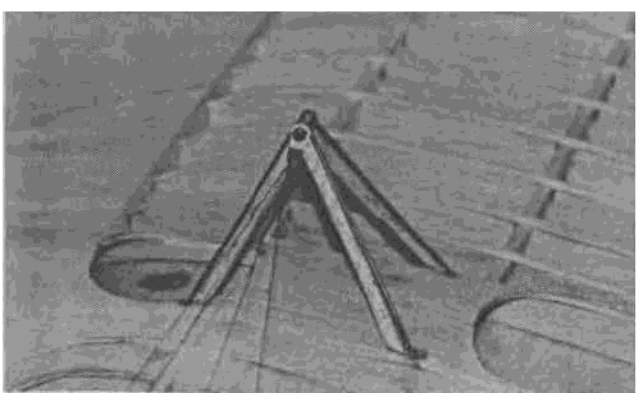
I recommend purchasing the Balsa USA Taube, which is a bargain, priced close to what the materials alone would cost. About 2/3 of the materials supplied in the kit can be used to build this design with minor or no modifications required for many of the precut and shaped parts.

CONSTRUCTION

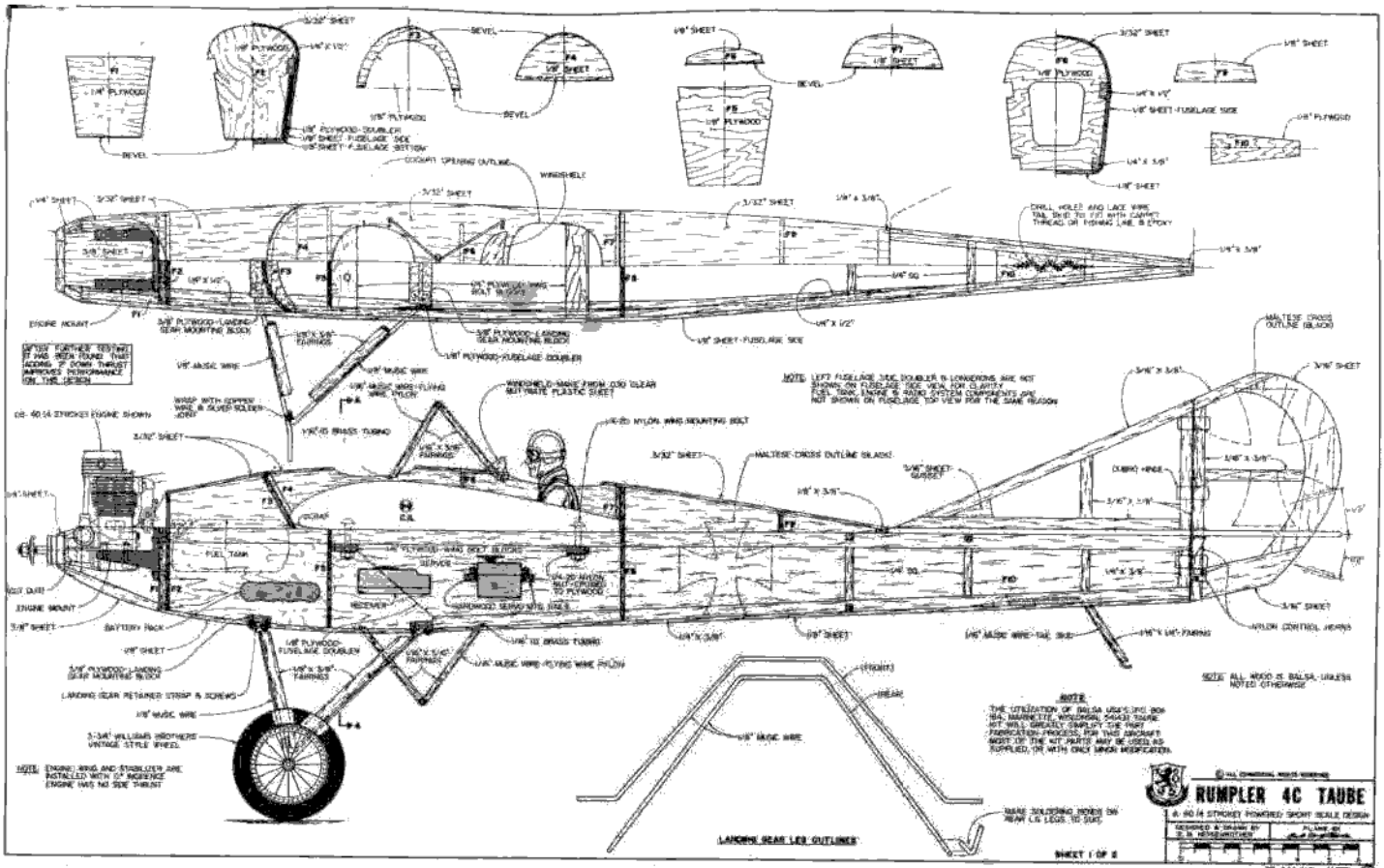
Wing:

Cut the wing ribs, trailing edges, tips, and leading edges from 1/8" balsa sheet. If you are using the Balsa USA kit, the ribs and trailing edge (W2, W3, W4) need minor modifications, as per the plans. The trailing edge and tip are laminated from two pieces,





LEFT: Elevator, rudder, throttle, and bomb release servos are located in the fuselage under the wing. RIGHT: The top pylon is inserted into brass tubes located between the cockpits. Solder lugs are used to attach the flying wires to the pylon.



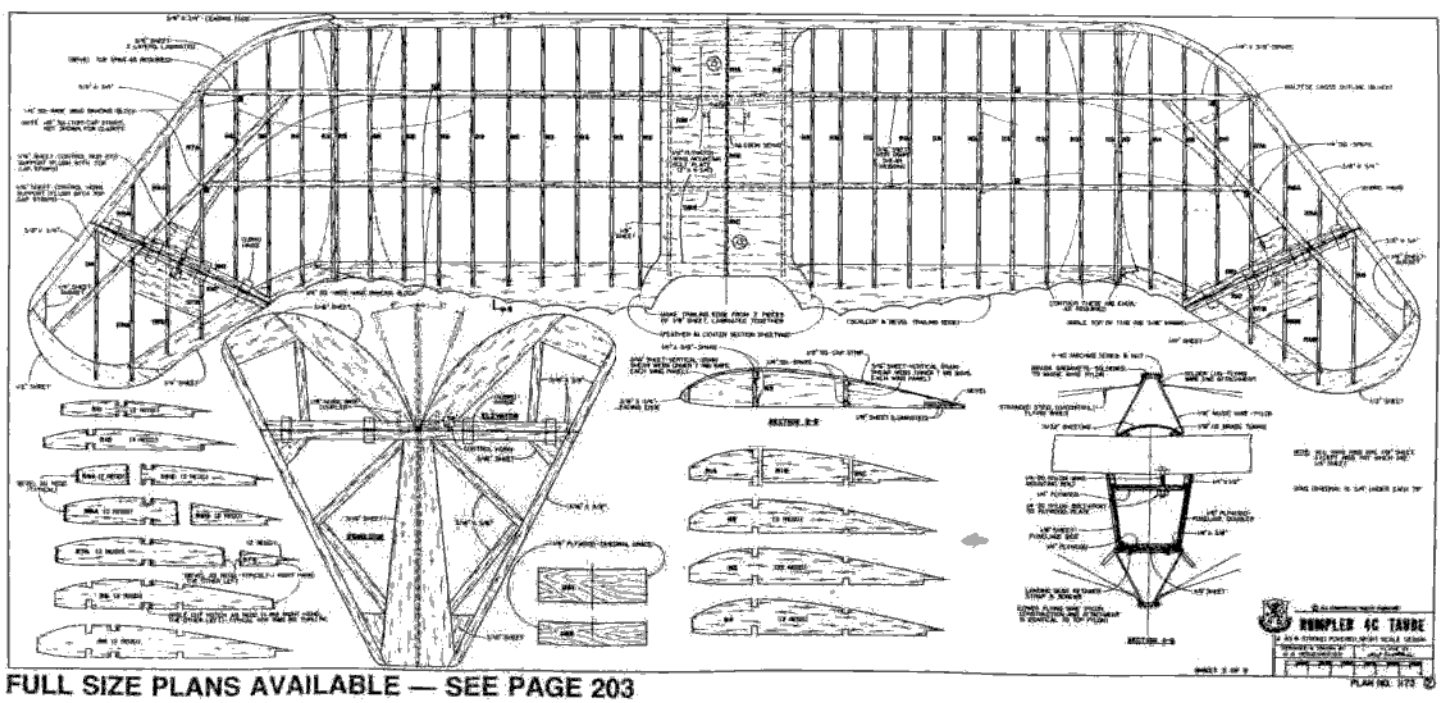
while the curved portion of the leading edge (W1) is laminated from six pieces. The wing is built in left and right halves and then joined using the plywood dihedral joints (DB1, DB2). Assemble each wing half by pinning the trailing edge, tips, and front and rear bottom spars to the plans. Insert and glue the ribs to the bottom spars and the trailing edge. Since the outboard ribs (R4-R10) are at an angle to the spars, the spar notches need to be cut at an angle also, and hand fit to the spars. With ribs in place, raise the leading edge 1/8'' off the plan and cement it to the ribs. Now insert and cement the top spars to the ribs. Glue 1/8'' sq. capstrips to the top of the ribs as shown in Section AA on the plans. The capstrips produce a realistic scallop when the wing is covered. Cut away the ailerons along the hinge line leaving zero gap at the bottom and a 3/16'' gap at the top.

The two wing halves are then joined using the plywood dihedral joints and the two 1/8'' x 2'' x 4¾'' plywood wing mount blocks. A dihedral of 3/4'' per wing half should be used (1½'' total).

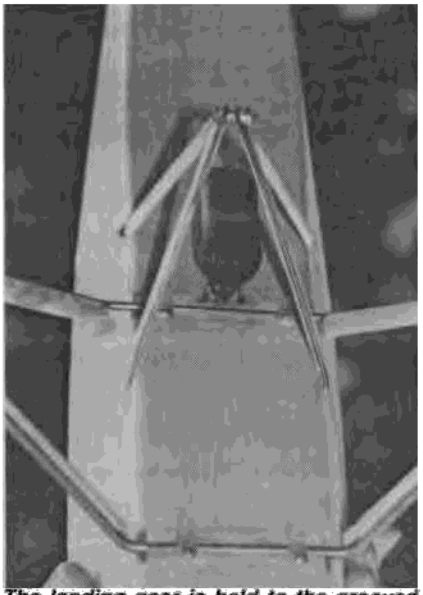
Locate the aileron control servo between the lower spars. I used NyRods to actuate the ailerons with the ailerons hinged at the bottom of the wing with the pushrods exiting the wing ahead of the aileron, and the control horn attached to the top of the ailerons. I use an aileron throw of 1'' in each direction. With the servo in place, cut and cement the center rib (R1, A, B, C) to the wing and sheet the lower center section with 1/8'' hard balsa.

Tail Assembly:

The ''tail feathers'' are entirely different



FULL SIZE PLANS AVAILABLE — SEE PAGE 203

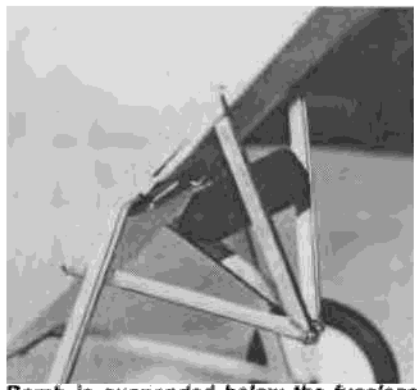


The landing gear is held to the grooved landing gear blocks by plastic tabs screwed to the blocks.

from those in the Balsa USA kit. They are built-up from 3/16" balsa sheet and 3/16" x 3/8" balsa stock. I recommend assembly of the rudder and elevator using the full length of the 3/16" x 3/8" leading edges. When dry, cut the elevators and rudder away from the stabilizer and fin. This ensures correct alignment. Before cutting the 3/16" x 3/8" leading edge of the elevators at the center, drill, insert, and cement the 3/32" music wire, linking the elevator halves. Sand, install control hinges, and cover.

Fuselage:

The fuselage sides are cut from 1/8" medium grade balsa sheet. These, and many other fuselage parts, are precut and supplied with the Balsa USA kit. Cement 1/4" x 1/2" and 1/4" x 3/8" balsa longerons along the top and bottom of the fuselage sides, as shown in the plans.



Bomb is suspended below the fuselage behind the landing gear struts. Note the balsa wood fairings on the landing gear and lower pylon.

Cement the 1/8" plywood doublers and the 1/4" square uprights on the fuselage sides. Epoxy bulkheads F1 and F2 and formers F5 and F8 to the fuselage sides, being careful to maintain symmetrical alignment about the centerline of the fuselage. When dry, trim the aft ends of the longerons to fit properly, leaving a 3/16" x 3/8" slot for the rudder fin post (to be added later) and cement the aft end of the sides together. Proceed to cement the plywood wing mounts and the grooved landing gear blocks in place. Note: If you are using the Balsa USA kit, the front landing gear block has been moved forward.

At this point, install the servos and pushrods in the fuselage. I use dowel pushrods for the rudder and elevator and NyRods for the throttle and bomb release.

Next, lay the wing in place on the fuselage and drill the wing mount holes through both the wing and fuselage plywood mounting blocks. Be sure that the wing is properly located and aligned when this is done. Tap the wing mounting blocks in the fuselage for the 1/4-20 nylon mounting bolts. As an added precaution, I epoxy 1/4-20 nuts to the fuselage mounting blocks as shown in section BB of the plans. Now sheet the top center of the wing with 3/32" balsa.

With the wing in place, cement formers F3 and F9 to the fuselage and F4, F6, and F7 to the top of the wing. When dry, remove the wing and sheet the cowling between F2 and F3, with 3/32" balsa. Cement S2 to F8 and F9 to form the sides of the turtledeck. When dry, form the top of the turtledeck with 3/32" sheet. Trim and sand the cowling and turtledeck.

Remount the wing and cement S1 between formers F4, F6, and F7 trimming for fit as shown in section BB on the plans. Then complete the top using 3/32" sheet balsa. Cut out the cockpit holes, shape and sand.

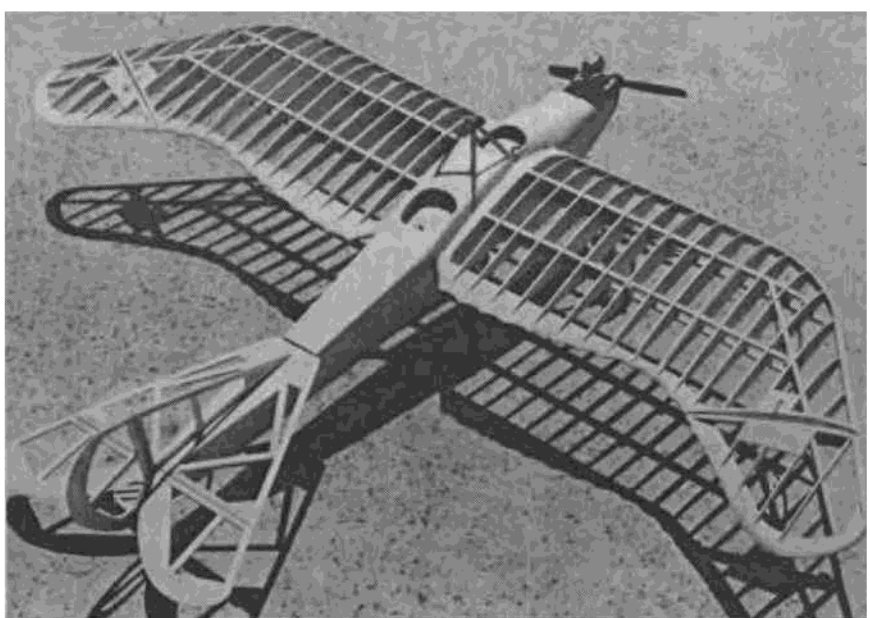
Attach the 1/16" wire tail skid to F10 (I sewed and epoxied it) and mount it in the fuselage. Attach the appropriate motor mount bracket to bulkhead F1. Drill the appropriate holes in F1 for the throttle control and fuel lines.

Mount and cement the tail to the fuselage, carefully aligning all surfaces with respect to the wing and fuselage centerline. Locate and attach the control horns to the elevator and rudder, checking control action. I use 1½" throw in each direction for the elevator and 2" throw each way for the rudder. This may seem excessive, but is needed at the minimum speed end of the flight envelope as well as for square maneuvers and spins.

Mount the engine, fuel tank, landing gear, and radio. Adjust the location of the C.G. to approximately 4" behind the wing's leading edge, by moving the location of the batteries and radio. My model did not need ballast to achieve this when I located the batteries behind F2 and the receiver behind F5. When balance is achieved, sheet the bottom of the fuselage with 1/8" balsa and sand it.

Details:

The Rumpler 4C had wire bracing strung from pylons located above and below the fuselage to take the lifting and landing loads from the thin wings. The model with its thick airfoil and strong spars has no need for wire bracing. For appearance and stand-off scale competition, I used 1/16" music wire to construct the pylons as shown in section BB of the plans. I made the pylons removable by inserting them in brass tubes cemented into the top of the wing and bottom of the fuselage. The left and right halves of the pylons are held together by a 4-40 bolt passing through the grommets at the apex of the pylon halves. The wires are threaded through solder lugs that are held by the pylon bolts and attached to the wings by small screw eyes screwed into the 1/4" square vertical posts in the wings at the locations shown on the plans. I used light braided steel control line for the wires. The wires can be removed by removing the 4-40 bolts on the pylons. To remove the wing from the fuselage it's necessary to remove the bottom wires.



Completed skeleton of the Taube ready for covering. Its low-tech construction of balsa and plywood is consistent with its ancient design.

Williams' wheels and pilot add realism to the model.

A simple bomb release can be implemented by locating a servo which drives a pin protruding from the bottom of the fuselage to secure the bomb. Early bombs were grenades or in some cases artillery shells.

Balsa fairings for the pylons and landing gear are cemented to the wires, shaped and covered.

I powered the model with an O.S. 40 Surpass 4-stroke engine driving an 11 x 6 propeller. An unpressurized 4 oz. tank is located directly behind bulkhead F2.

I covered the model with Coverite's Pearly White Micafilm on all but the cowling where I used Aluminum Micafilm. The insignia were cut from black Solarfilm and ironed onto the Micafilm.

Flying:

The model weighed in at 64 ozs. dry, producing the low wing loading of 14.5 oz./sq. ft. The low wing loading and high power to weight ratio give the model a large flying speed range and good maneuverability. The large wheeled taildragger configuration makes for excellent grass and rough field performance. Most of my flying is off a soccer field. Using full power on take-off, the model travels about 10' in about one second to become airborne. Reduced power achieves realistic slow flight and engine sound. The plane is easy to fly and aerobatic. □

ABOUT THE AUTHOR

Rudy Hergenrother, a retired Electronics Engineer, lives in Santa Barbara, California. He has been a model airplane builder and flier for 50 years. He flew competition free flight (power, rubber, and sailplanes) as well as control line (speed, stunt, and combat) in the late 40's and early 50's, being sponsored to the Plymouth Internationals four times.

Currently Rudy is flying R/C scale, sailplane, and slope soaring models. His other hobbies include scuba diving, sailing, photography, teaching natural science, collecting classical jazz recordings, and painting watercolors.

From RCModeler Aug. 1994