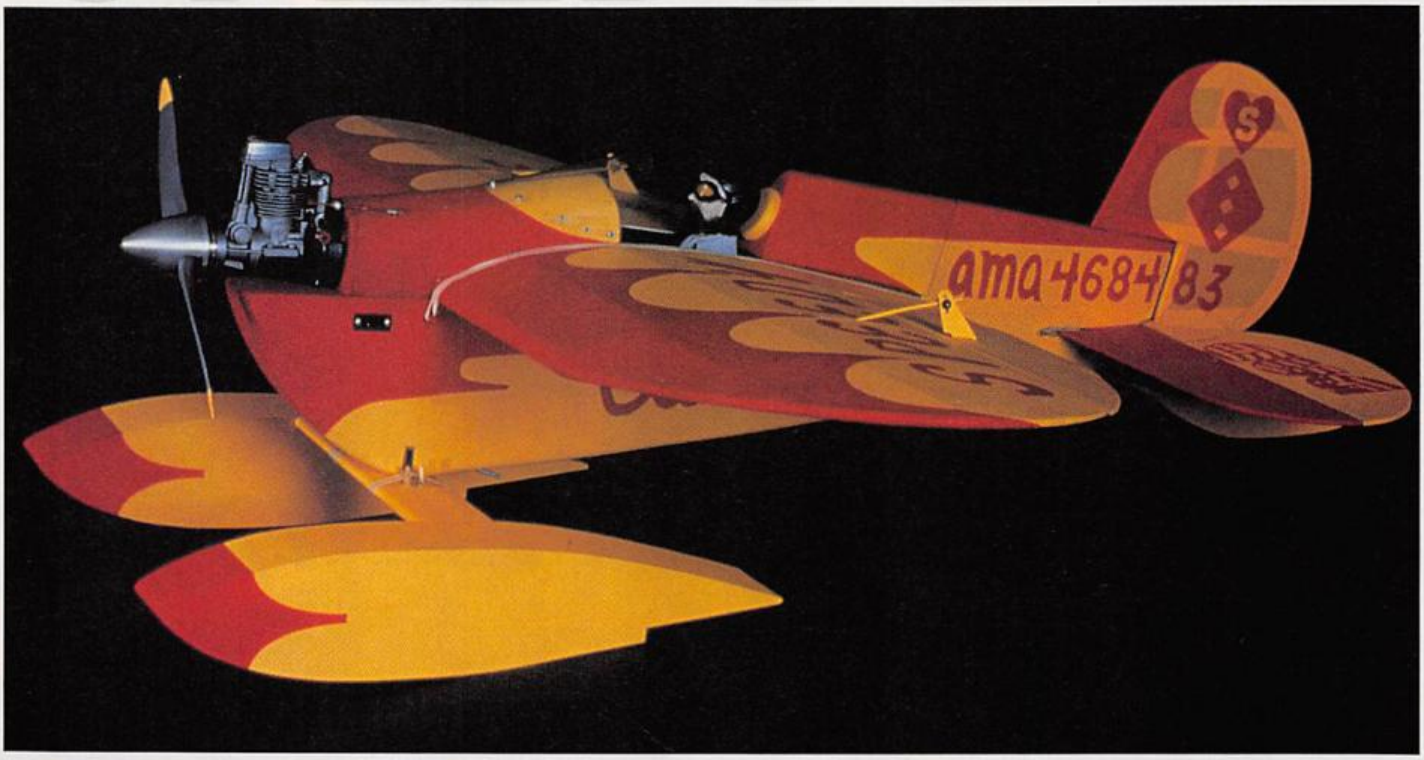
A Great Flying Model With A Different Look

SPEEDY BEE



By Andy Clancy

Are you tired of planes that all look alike? Would you like to fly more but you don't like the long drive to the flying field? Well, have I got a plane for you!

The Speedy Bee can be flown almost anywhere — you don't land it, you park it! Its spring landing gear and balloon wheels allow it to fly from terrain more suited to R/C off-road cars than airplanes. Even though you may be able to fly it in your backyard, the Speedy Bee is such an attention getter, you'll want to take it to the flying field at least once.

With its low wing loading and mild control throws, it's fairly easy to fly. But beware — this is no trainer! With maximum control throws, its responsive agility will satisfy even the most demanding pros.

I flew my prototype with an O.S. .26 Surpass 4-stroke and with the Model Electronics Turbo 10 electric motor. The plane performed well with both power plants, and any engine in the .09 to .26 range should fly it just fine. I use the DAD® Tina microservos in my plane. They are probably the best buy in microservos today. Standard size servos could be used with a gas powered Speedy Bee, but the extra weight will increase your stall speed. I don't recommend using standard servos for an electric powered Speedy Bee. To save weight, I always use a 250 mAh receiver battery pack.

Electrification Modifications

I flew my Speedy Bee with the Model Electronics Turbo 10 System. No BEC was used. With ten 1700 mAh cells, it had ballistic performance. It is shocking to see an electric plane take off in under 20 feet and climb out vertically until nearly out of sight! A typical comment heard from other modelers while watching this electric-powered hot rod was: "Gee, what kind of muffler are you using?" The drawback to this set-up is that it is a little heavy, so I tried using just 7-cells. The stall speed was noticeably slower and the performance was still impressive. I think an ideal set-up would be a 10-cell 1000 mAh battery pack and a BEC with the Turbo 10 motor.

I used the motor mount supplied by Model Electronics and I highly recommend it. The motor requires several degrees of up thrust and side thrust because of the high thrust line and the huge amount of torque. The battery pack was mounted on a 1/16" plywood shelf using plenty of Velcro. The shelf is glued on top of the lowest stringers and should be as long as the longest battery pack used. The shelf should be centered about the plane's balance point so that using different sized battery packs won't change the C.G.

A battery access door can be built into the side of the fuselage. I used an external

"The Speedy Bee can be flown almost anywhere — you don't land it, you park it!"

SPEEDY BEE

Designed by:
Andy Clancy

TYPE AIRCRAFT
Sport

WINGSPAN
40 Inches

WING CHORD
11-7/8 Inches (Avg.)

TOTAL WING AREA
475 Sq. In.

WING LOCATION
Mid-Wing

AIRFOIL
Custom — Flat Bottom

WING PLANFORM
Elliptical (0 Degrees Incidence)

DIHEDRAL, EACH TIP
1-5/16 Inches (7.5 Degrees)

OVERALL FUSELAGE LENGTH
31.9 Inches

RADIO COMPARTMENT SIZE
(L) 21" (W) 2-3/8" (H) 3-1/2"

STABILIZER SPAN
21-9/16 Inches

STABILIZER CHORD (inc. elev.)
5-5/8" (Avg.)

STABILIZER AREA
121 Sq. In. (Appx.)

STAB AIRFOIL SECTION
Flat

STABILIZER LOCATION
Lower-Mid Fuselage (2.84° Incidence)

VERTICAL FIN HEIGHT
8-5/8 Inches

VERTICAL FIN WIDTH (inc. rud.)
5-1/2 Inches (Avg.)

REC. ENGINE SIZE
.09-.26 Cu. In./Turbo 10 Electric Motor

FUEL TANK SIZE
4 Oz./7-10 Cells 1000 mA Battery

LANDING GEAR
Conventional

REC. NO. OF CHANNELS
4

CONTROL FUNCTIONS
Rud., Elev., Throt., Ail.

C.G. (from L.E.)
3.75 Inches

ELEVATOR THROWS
1/2" Each Way

AILERON THROWS
1/2" Each Way

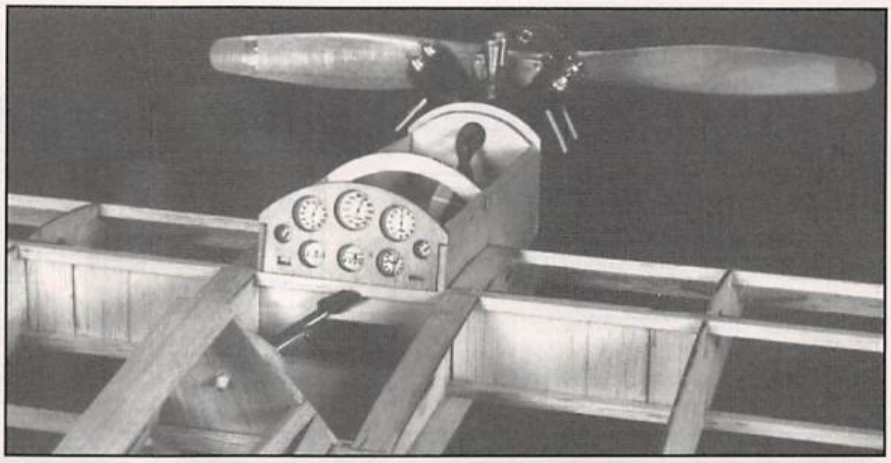
RUDDER THROWS
1/2" Each Way

SIDETHRUST
2 Degrees Right

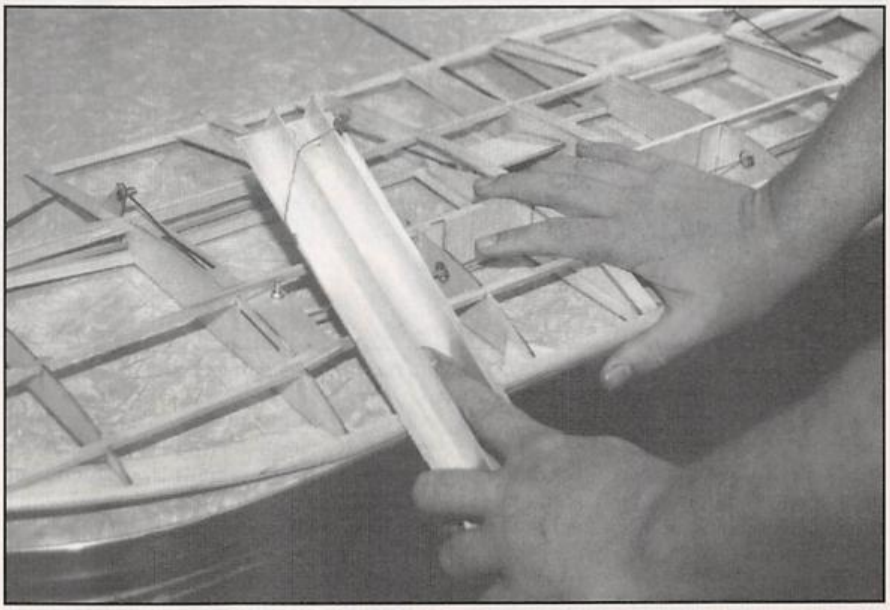
DOWNTHRUST/UPTHRUST
3 Degrees Up

BASIC MATERIALS USED IN CONSTRUCTION

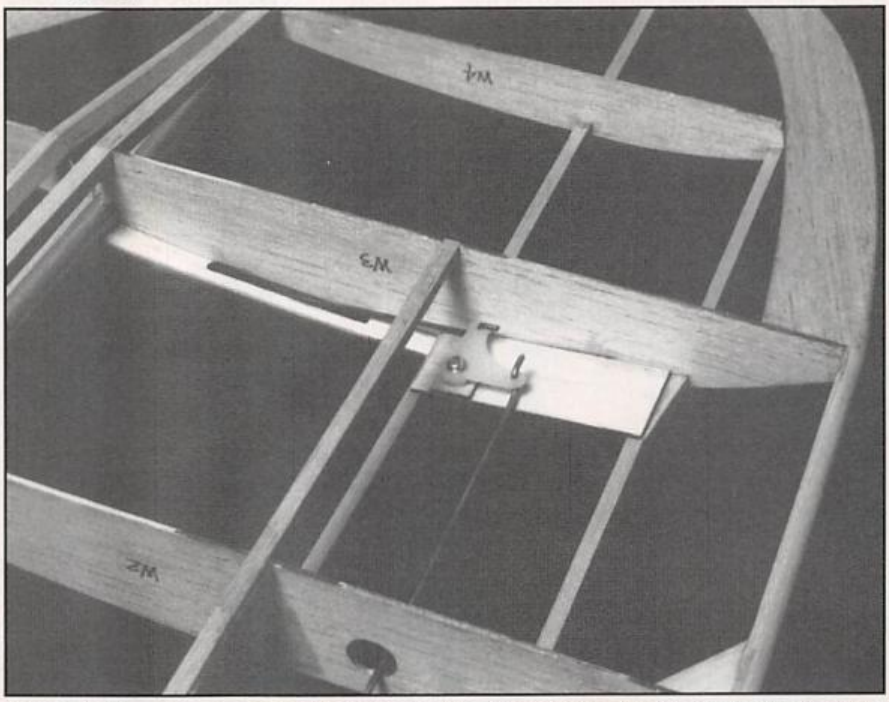
Fuselage ..... Balsa & Ply
Wing ..... Balsa & Ply
Empennage ..... Balsa & Ply
Wt. Ready To Fly ..... 42 Oz.
(2 Lbs., 10 Oz.) 4-Stroke
Wing Loading ..... 12.74 Oz./Sq. Ft.



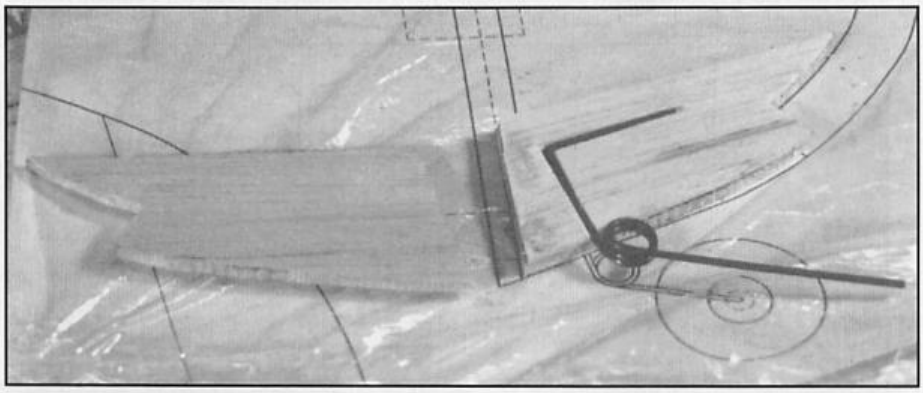
The front end and instrument panel assembly are assembled first so they can be fit into the wing center section. See text for details.

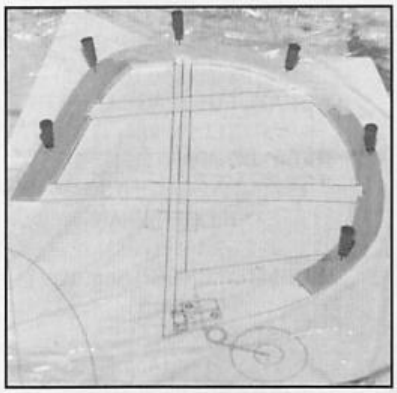


The wing structure is built-up balsa to help keep the weight to a minimum. Leading edge is being shaped here.



Aileron bellcranks are mounted to bottom side of top spars, with aileron pushrod exiting from top of wing.





LEFT: Tail wheel wire is bent from .047" dia. music wire and is fit into slot in R1. RIGHT: 1/8" balsa frame is pinned in place over plan while glue cures, then is removed for next step.

charging jack. The dummy V-4 motor you see in the photos was made from Cox .020 heads, Peck Polymer's plastic cylinders, some aluminum tubing, and a laminated 1/64" plywood base which is held in place on the motor with some Velcro.

My method for cutting out parts is to use Post-it™ glue sticks to stick the parts templates (or copies of them) to the wood. The grain direction is noted on the plans for each group of parts, so take note of this before you cut them out. Post-it glue sticks use an easily removable type glue made by 3M and are available at some office supply stores. You may have trouble finding it, I had to try several stores. It's worth the trouble.

I usually use a band saw to cut out parts. I use pins to hold stacks of wood together while cutting out multiple parts. Even though I cut thousands of parts this way during the first year of Lazy Bee™ production, it still surprises me how well I can drive a band saw — and that I still have 10 fingers! Before I had the band saw, I used single edge razor blades to cut parts from sheet balsa.

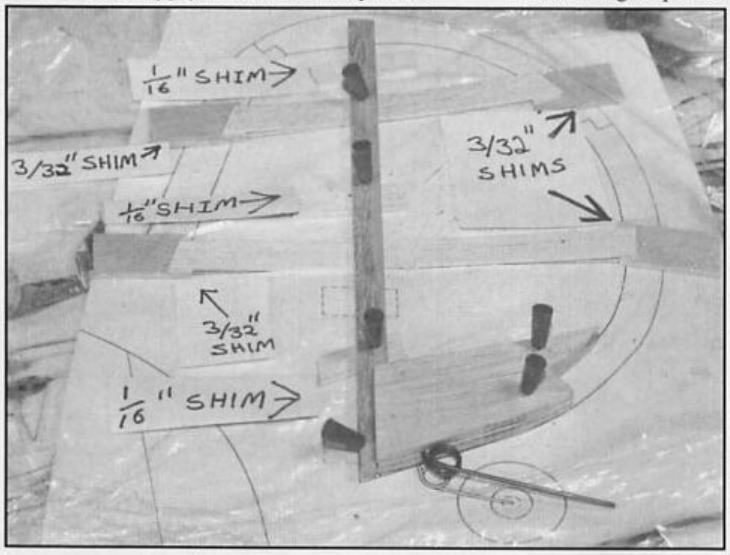
CONSTRUCTION

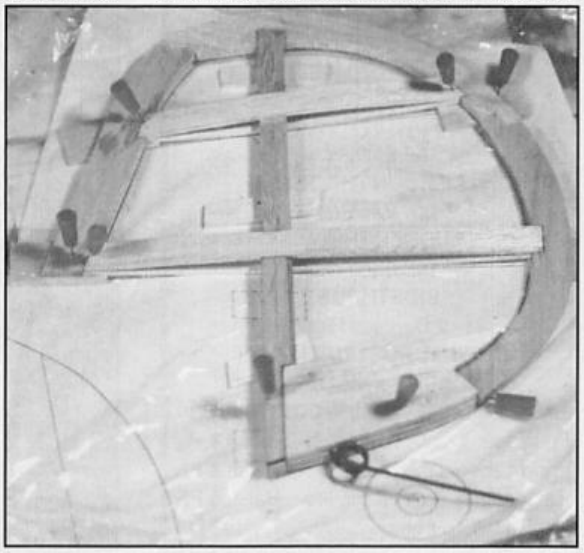
Building Sequence:

The building sequence is important on the Speedy Bee, because you need to have the engine nacelle built first to make sure it fits snugly between the center wing ribs while you're building the wing. You also need to have the wing done in order to build the fuselage since the turtledeck of the fuselage is built with the wing in place on the fuselage. However, it doesn't matter when you build the tail, just as long as you do build it, as I don't think the plane will fly without it. But I invite you to prove me wrong — send an in-flight photo please!

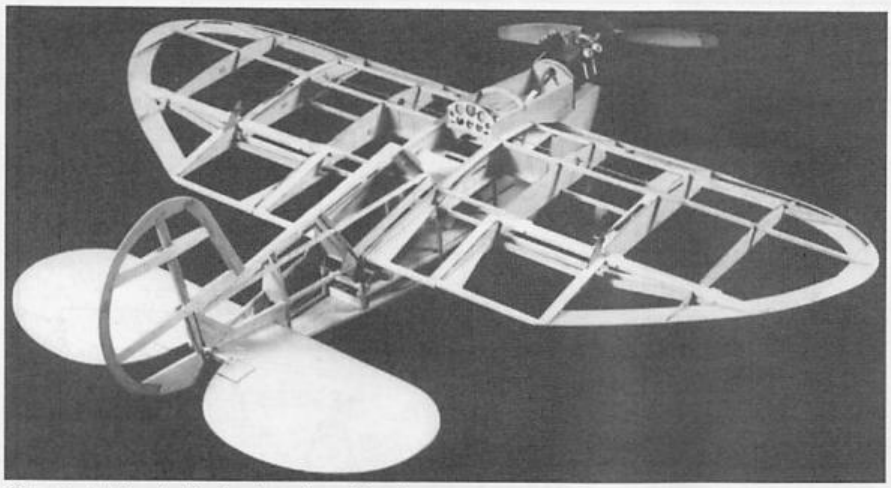
Engine Nacelle:

Make the fire wall by laminating the two 1/16" plywood NF1 parts together

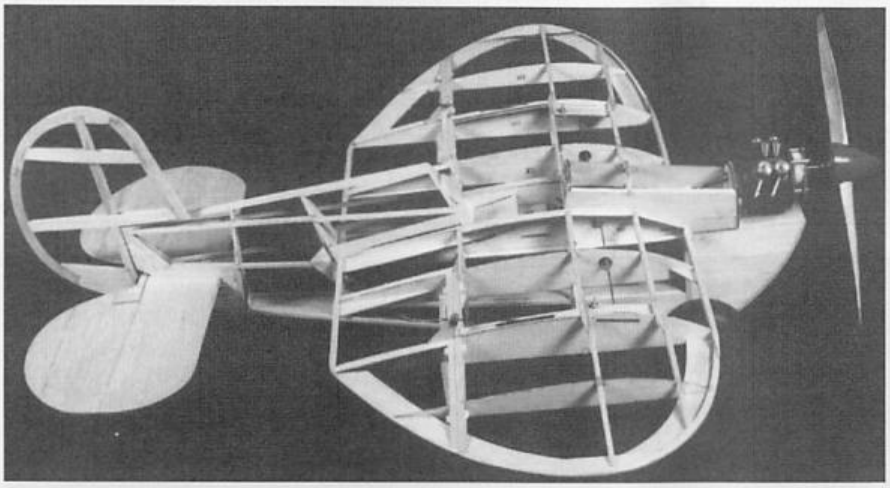




LEFT: 1/16" and 3/32" shims are positioned as shown, below the plastic wrap. R1 is then glued to rudder post and ribs positioned. RIGHT: When glue has cured, remove assembly from plans and sand to shape.



Simple, lightweight structure is evident here.



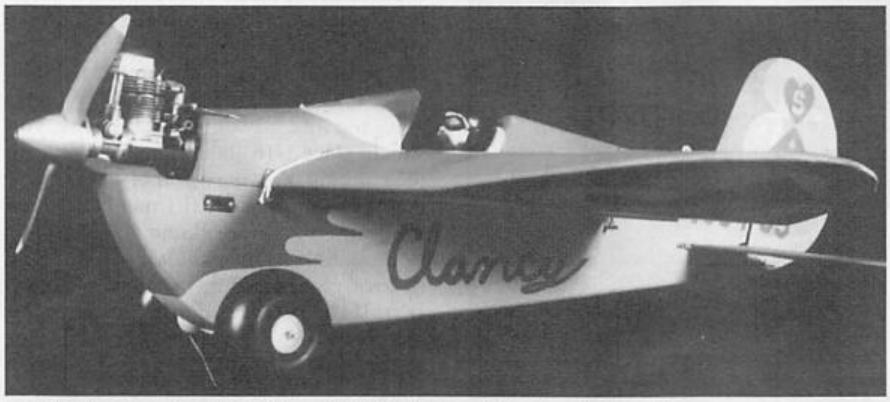
Dummy V-4 engine covers the Model Electronics Turbo 10 electric motor/gear drive unit used on the electric version.

using epoxy, then glue NF2 to the fire wall. The instrument panel should be assembled next. Use white glue to glue the paper instrument panel IS to NF4. Next, carefully glue the clear, .010 thick acetate (part IG) over the paper instrument panel. Make sure that you don't get any glue on the instrument dials. Now glue the 1/32" plywood face plate on top of the acetate, again being careful not to get glue on the instrument dials.

The fuel tank shelf should now be fitted into the locating slots of the 1/8" nacelle sides. Pin the fire wall NF3 and the instrument panel in place between the nacelle sides. Check the nacelle alignment against the top view of the plans and dribble thin CA into all glue joints. Use two layers of flexible 1/16" sheet balsa for the nacelle top sheeting.

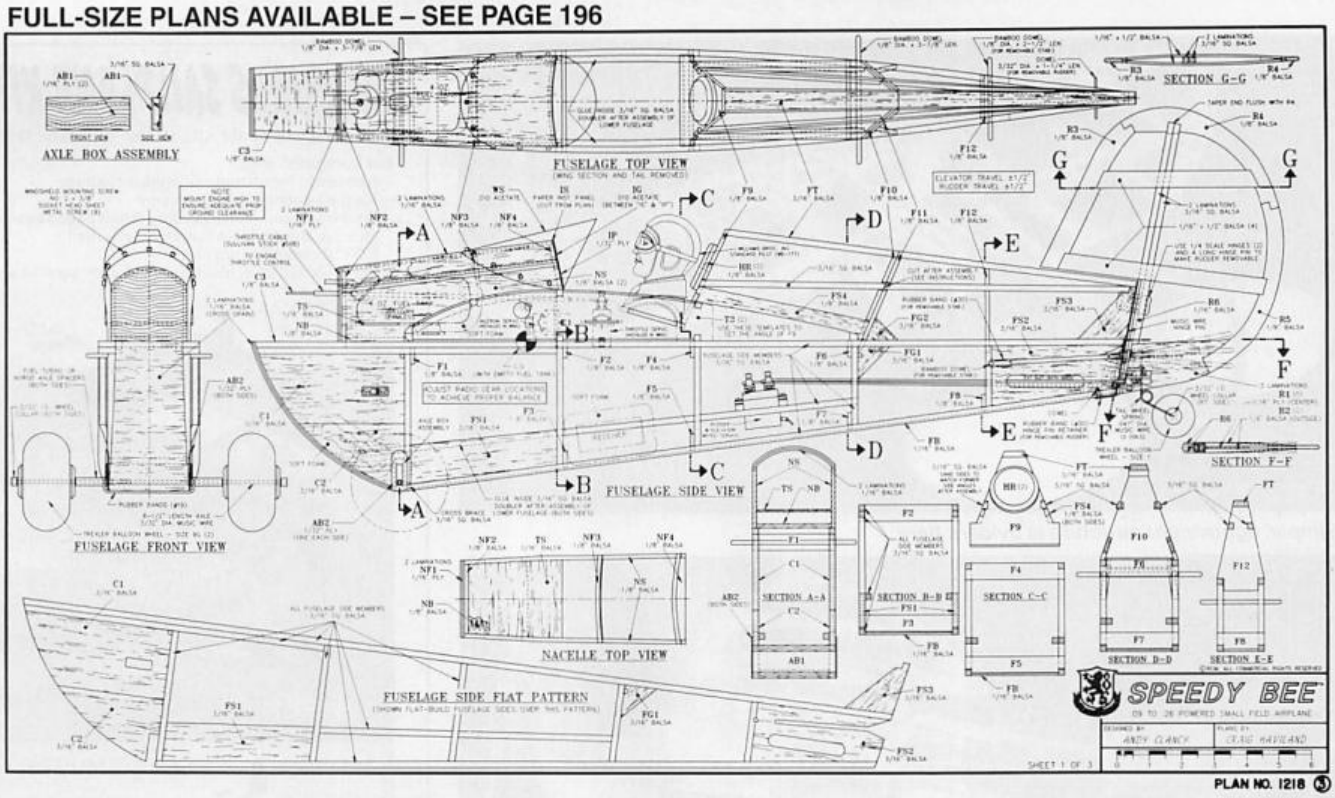
Building The Wing:

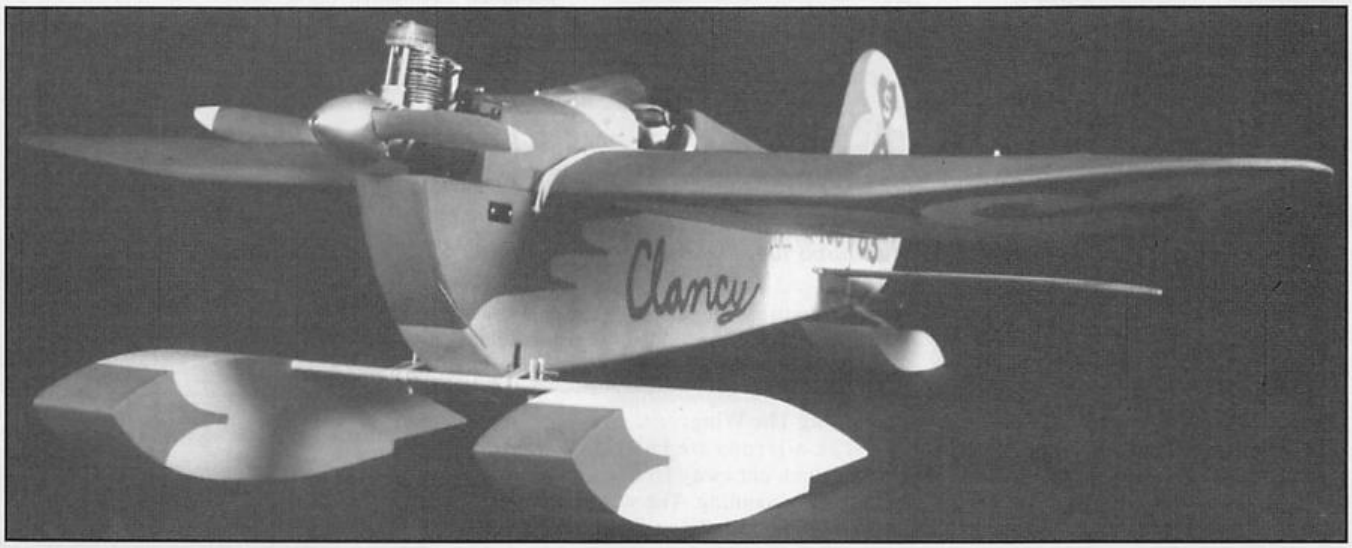
The ailerons are built as part of the wing, then cut away from the completed wing after sanding. The wing is built flat on the plans over a building board. The wingtips should be built first and there is a template for setting the angle of the wingtip ribs so that these ribs are vertical after the dihedral has been added. The same template is used as a guide for cutting the ends of the leading and trailing edge spars to shape. I like to pin as much



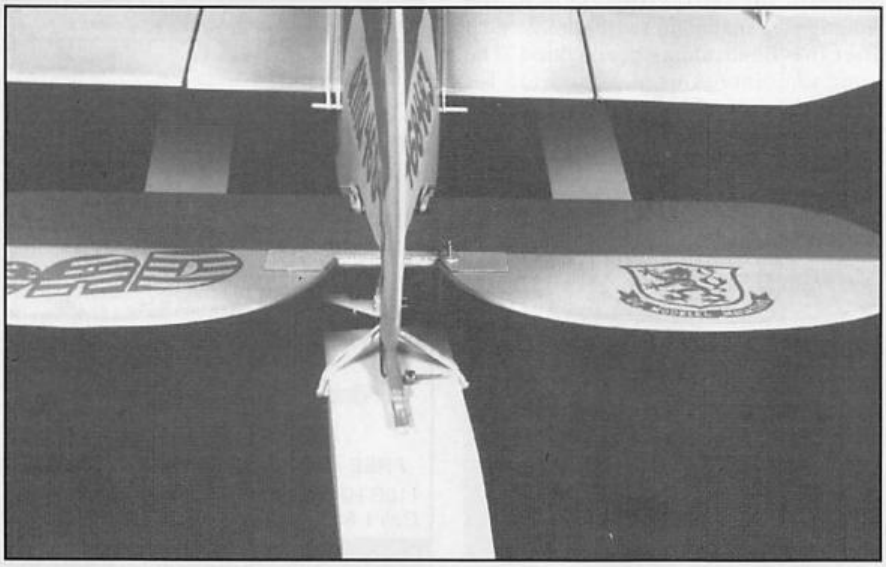
On the glow powered model, an O.S. FS .26 supplies plenty of performance.

FULL-SIZE PLANS AVAILABLE – SEE PAGE 196





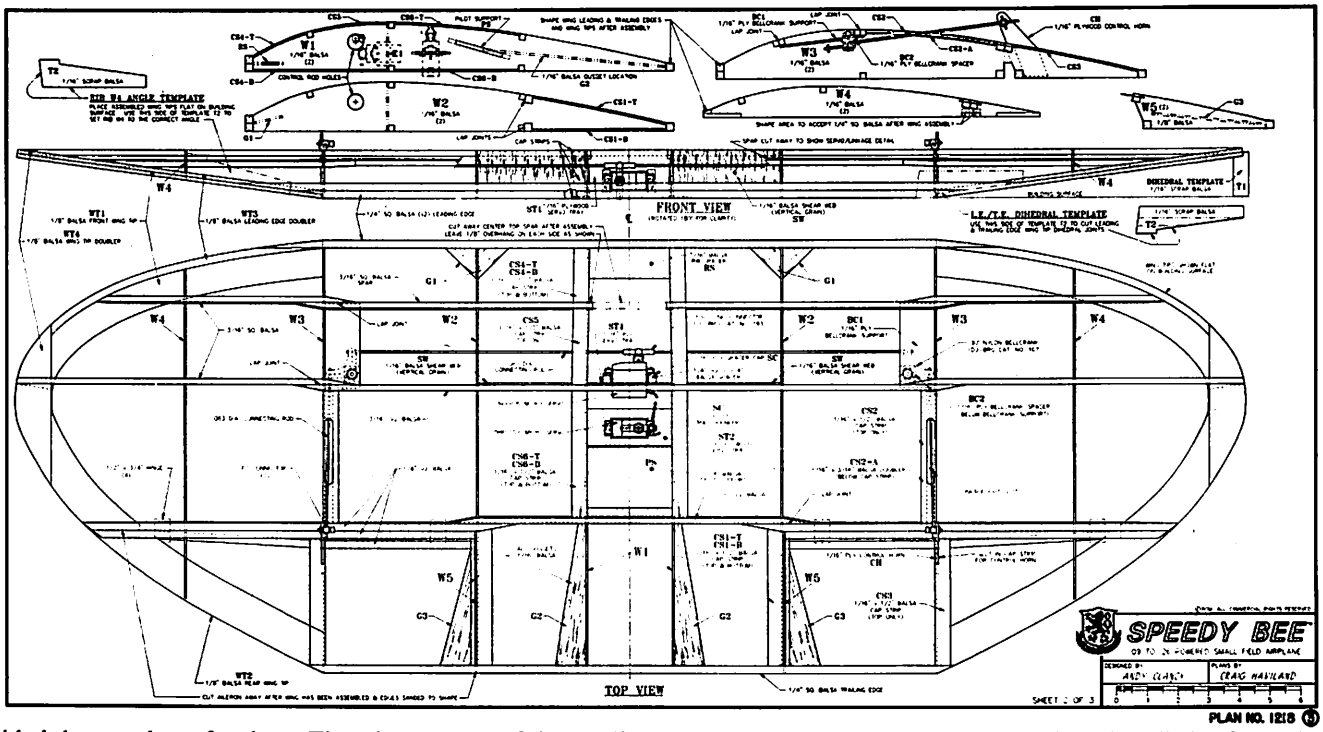
Speedy Bee on floats. This just increases the fun potential!



Rear end shot shows tail float and stabilizer attachment using rubber bands.

of the wing together as possible before gluing. Check the alignment of every part three or four times before gluing, because when you align one rib, you tend to push the adjacent ribs out of alignment. The center ribs (W1) will have slots cut in them to accept tabs on the throttle servo tray, pilot shelf, and rib spacer. These should be in position between the center ribs before these are pinned in place. Also, since the center ribs are cut 1/16" under size, top and bottom for capstrips, you should place 1/16" thick shims underneath them during the wing assembly. Make sure that the engine nacelle fits snugly between the center ribs before gluing.

Assemble as much of wing as possible before you remove it from the plans. Install the remaining bits, such as the aileron servo tray, shear webs, lower spars, etc. I should point out that the shear webs have notches cut in them to allow for capstrips. That's why we pro-



vided the templates for them. The wing should be sanded to shape before you start on the fuselage.

Sanding The Wing:

I've heard a few guys complain that it takes too long to shape the square stick leading and trailing edges that I use in my designs. The truth is that it all depends on how you do your sanding. Here's what I do: I don't waste time carving or planing, I just get some 60 grit sandpaper, the kind with the adhesive backing used on power sanders (caution: don't use a power sander unless you want to build another wing!), and stick the sandpaper to a block of wood. Shape the leading edge by holding the wing flat over a sturdy table with the leading (or trailing) edge parallel to, and right at the edge, of the table, so that the table supports the wing but is not in the way of the sanding. You can now apply considerable force during the sanding procedure. You can also use this method for shaping the rounded wingtips, just work on small sections at a time. Do the finish sanding with 120 grit sandpaper.

Fuselage:

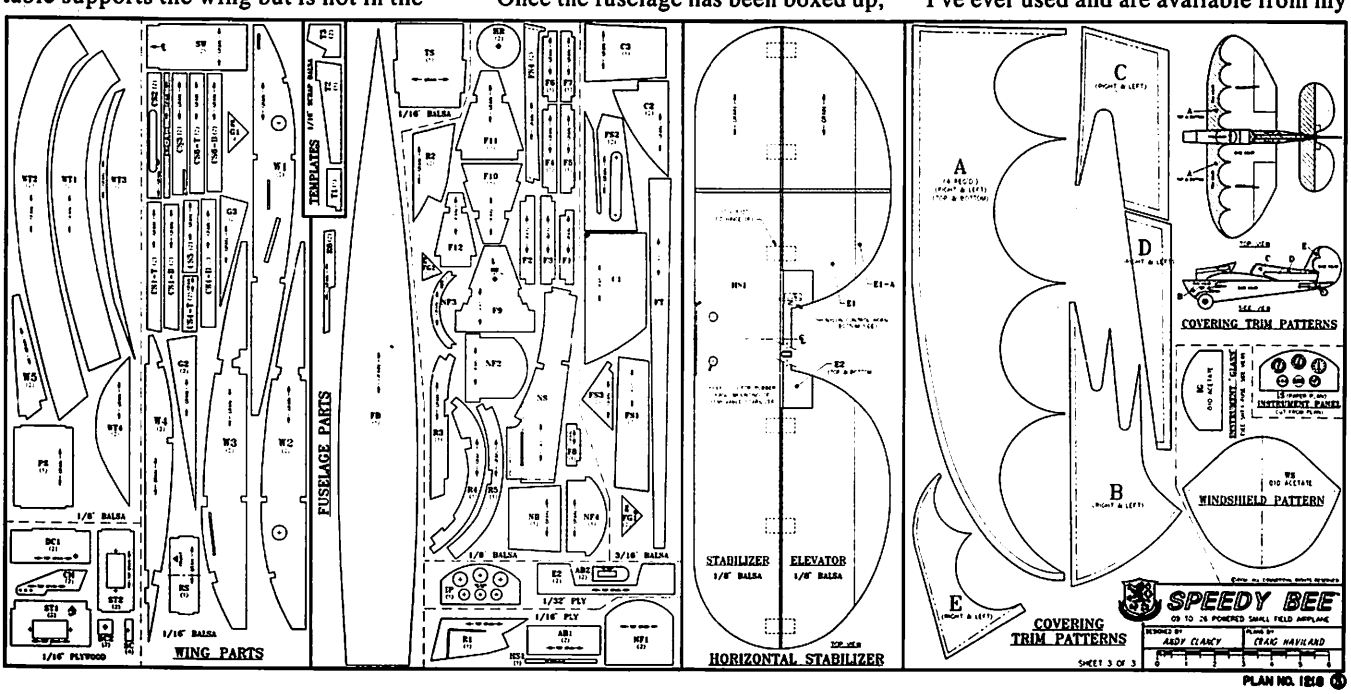
The fuselage side frames are built over the side frame drawing on the plans. I build the second side frame over the first side. I also drill all the dowel holes with the side frames stacked on top of each other. Note that the fuselage top and bottom cross members are slightly different. This is because the fuselage bottom sheeting fits **between** the lower longerons, not **below** them, so the lower fuselage cross members are cut slightly undersize to accommodate this.

Once the fuselage has been boxed up, the wing should be installed before building the turtledeck. This will be built in one piece and the front part will be cut away after the assembly. This will be glued to the wing after covering.

Building The Vertical Fin/Rudder:

Step 1 — Make the tail spring by wrapping a piece of music wire around the shaft of a Phillips screwdriver. Bend the upper portion of the tail spring to fit in the slot in part R1. Do not bend the axle portion of the tail spring until after the rudder is completely assembled. Part R1 is sandwiched between the two R2's, locking the tail spring in place.

Step 2 — Build the 1/8" balsa rudder outline flat over the plan. I use Modela modeling pins to hold the things together while the glue dries. They are the best pins I've ever used and are available from my



Material List

1 — 4-channel radio, microservos suggested
1 — Engine .09 (2-stroke) to .26 (4-stroke), with mount, mounting screws, propeller and spinner, fuel tubing, and 4 oz. Sullivan Flex Tank (slant type: FSS-4 #737)
Or, for electric power:
1 — Model Electronics Turbo 10, 6:1 gear-drive motor, Master Airscrew 13 x 10 Electric Wood Prop, Model Electronics 10-cell 1000 mAh battery and BEC Speed Controller

Wood List

15 — 3/16" x 3/16" x 36" balsa sticks
7 — 1/4" x 1/4" x 36" balsa sticks
6 — 1/16" x 3" x 36" sheet balsa
4 — 1/8" x 3" x 36" sheet balsa
1 — 3/16" x 3" x 36" sheet balsa
1 — 1/32" x 6" x 12" plywood
1 — 1/16" x 6" x 12" plywood
1 — 1/8" diameter x 10.5" (min.) bamboo dowel (sold in stores as bamboo skewers)
1 — 3/32" diameter x 1-1/4" bamboo dowel (or equivalent)

Hardware List

1— 1/16" wheel collar (Du-Bro #137)
2 — 3/32" wheel collar (Du-Bro #138)
1 — 3/32" dia. x 8.5" music wire (axle)
1 — 3/64" dia. x 8" music wire (tail spring)
9 — screws, No. 2 x 3/8" socket head sheet metal screws (Du-Bro #380)
2 — nylon control horn (Du-Bro #237)
2 — 90° nylon bellcrank assembly (Du-Bro #167)
2 — heavy duty nylon hinge (Du-Bro #257)
10 — EZ Hinge (Sig #SH-710)
7 — EZ connector (Du-Bro #121)
1 — Aileron connector (Du-Bro #183)
1 — Throttle Cable (Sullivan #508)
2 — .072" dia. x 12" threaded rod (2-56 threads on one end, Du-Bro #172)
1 — .062" dia. x 36" music wire (Sig MW-003)
1 — 6" x 12" x .010" acetate (for windscreen, instruments)

Items available from Clancy Aviation

1 — Speedy Bee wheel set (two 3" and one 1" Trexler balloon wheel)
1 — Trexler pump for inflating balloon wheels
3 — Rolls of Easytex Covering (2 rolls of a lighter base color, 1 roll of trim)

Clancy Aviation, 219 W. 2nd Ave., Mesa, AZ 85210-1317, tel: (602) 649-1534, fax: (602) 649-9040
Model Electronics Corp., 6500 6th Ave NW, Seattle, WA 98117, tel: (206) 782-7458.

favorite hobby supplier, Clancy Aviation.

Step 3 — Be sure that the 1/16" and 3/32" scrap balsa shims are positioned below the plastic wrap. 1/16" shims are used under the center rudder post, and 3/32" shims are placed around the leading and trailing edges where the ribs join them.

Step 4 — After the glue has set, the completed rudder is ready to be removed from the plan.

Stabilizer/Elevators:

The stabilizer and elevators are cut from 1/8" balsa sheet. The elevators are reinforced with 1/32" plywood at the center section on both the top and bottom. The stabilizer also gets reinforced on the leading edge with plywood as shown on the plans. Drill the two holes for the rubber bands, install the hinges, but do not glue in place until after covering. Final sand everything and prepare for covering.

Covering The Speedy Bee:

For covering, I use a new product called Easytex. It is an iron-on fabric that is incredibly easy to use (hence the name). It comes in a wide range of colors and covers itself without bubbling, goes around compound curves with ease, and is so strong that you can't poke a ballpoint pen through it! It's the best covering I have ever used and I like it so much that I decided to import it for our Clancy Aviation customers.

All aileron linkage should be installed

before the wing is covered. The top of the ailerons should be covered before the aileron control horns are glued in place. Only after the control horns are in place should the bottom of the ailerons be covered.

Final Assembly:

The fuel tank should be installed in the nacelle before it is glued to the wing. The stabilizer is pulled forward in its slot by two #30 rubber bands on each side. First, one end of the rubber band is attached to the dowel in front of the stab; the rubber band then goes from the dowel through the hole in the stab, and then back to the dowel again. Use this procedure for installing each rubber band. The rudder is held on with hinges that have a removable hinge pin. I had to cut the lower rudder hinge down in size.

The pilot's shoulders will need to be cut to fit inside the cockpit. The beard was made by gluing balsa sawdust onto the pilot's face with some thin CA.

Install everything on your plane except the rudder and elevator servos, the receiver and its battery, then check the balance. Position these last items wherever they are needed to achieve the proper balance. The wing should be attached with eight #19 rubber bands. Note: All rubber bands should be replaced after each flying session. Make sure you have the correct control surface throws, proper balance, and a motor that runs reliably at all attitudes before test flying on a calm day (both the wind and the pilot should be calm!). Have fun and fly safely.

A Note On The Photos

I have decided to share my secret for getting such beautiful photos like the ones in this article and in our Clancy Aviation ads. These photos were all taken by high school students from Mrs. Sue Wright's Photography Class at the East Valley Institute of Technology (EVIT) here in Mesa, AZ.

If you ever need photos for a construction article, or for marketing a kit, I suggest you contact your local high school, vocational school, or college. You will get high quality photos taken by talented students who are ambitious and eager to please. Believe me, they are highly motivated to take the best pictures possible. Each project you give them is a learning opportunity (a side benefit is that you will also be exposing the students to model aviation).