"SPEEDY BEE" by ANDY CLANCY

Introduction

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 sprung 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 OS .26 Surpass Four stroke and with the Model Electronics Turbo 10 electric motor. The plane performed well with both powerplants, and any engine in the .09 to .26 range should fly it just fine. I use the DAD Tina micro servos in my plane. They are probably the best buy in micro servos today. Standard size servos could be used with a gas powered Speedy Bee, but the extra waight 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 charging jack. The dummy V4 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 tm 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 tm glue sticks use an easily removable type glue and are 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 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 in the first year of *Lazy Bee* tm production, it still surprises me how well I drive a bandsaw - and that I still have 10 fingers! Before I had a band saw, I used single edge razor blades to cut parts from sheet balsa.

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 turtle deck 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 firewall by laminating the two 1/16" plywood ***NF1*** parts together using epoxy. Then glue ***NF2*** to the firewall. The instrument panel should be assembled next. Use white glue to glue the the paper instrument panel ***IS*** to ***NF4***. Then 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 gas tank shelf should now be fitted into the locating slots of the 1/8" nacelle sides. Now pin the firewall ***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 wing tips should be built first and there is a template for setting the angle of the wing tip ribs so that these ribs are vertical after the dihedral has been added. This 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 of the wing together as possible before gluing. Check the alignment of every part 3 or 4 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 the center ribs are cut 1/16" under size, top and bottom, for cap strips. So 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 cap strips. That's why we provided 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 sand paper, 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 wing tips, 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. I should point out 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 turtle deck. 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 Rudder - Photo Sequence & Captions

STEP1

Make the tail spring by wrapping apiece 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. The photo shows this about to be done.

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 favorite hobby supplier, Clancy Aviation.

STEP 3

Study this photo carefully. Notice that the 1/16" and 3/32" scrap balsa shims are postioned below the plastic wrap.

STEP 4

This photo shows the completed rudder ready to be removed from the plan.

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 ball point pin 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 gas 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, and the receiver and its battery, and 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!

***SPEEDY BEE* SPEC SHEET**

NAME: Speedy Bee

DESIGNED BY: Andy Clancy

TYPE AIRCRAFT: Sport

WINGSPAN: 40"

WING CHORD: 14"

TOTAL WING AREA: 475 sq in (3.3 sq ft)

WING LOCATION: Mid-Wing

AIRFOIL: Custom - Flat Bottom

WING PLANFORM: Elliptical, 0 degrees incidence

DIHEDRAL, EACH TIP: 7.5 degrees

OVERALL FUSELAGE LENGTH: 31.9" (includes rudder, w/o motor)

RADIO COMPARTMENT SIZE: 21" x 2 3/8"x 3 1/2 (Avg) (L x W x H)

STABILIZER SPAN: 21.56"

STABILIZER CHORD (inc. elev.): 6.87" (max)

STABILIZER AREA: 121.34 sq in

STAB AIRFOIL SECTION: Flat

STABILIZER LOCATION: Lower- Mid Fuselage, -2.84 degrees incidence

VERTICAL RUDDER HEIGHT: 8.66"

VERTICAL FIN WIDTH (inc. rud.): 7.50" (max)

REC. ENGINE SIZE: .09 to .26 cu. in.

FUEL TANK SIZE: 4 oz

LANDING GEAR: Tail Dragger

REC. NO. OF CHANNELS: 4

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

C.G. (from L.E.): 3.75"

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: Balsa & Plywood

FUSELAGE- Balsa & Plywood

WING - Balsa & Plywood

EMPENNAGE - Balsa & Plywood

Wt. Ready To Fly: 42 oz (with .26 4-cycle engine, micro radio system, Easytex covering)

Wing Loading: 12.74 oz/ sq ft

Speedy Bee Materials List

QTY	DESCRIPTION
1	4-Channel Radio, micro servos suggested
1	Engine .09 (2-cycle) to .26 (4-cycle), with mount, mounting screws, propeller, & 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 1000mAh Battery & BEC Speed Controller

WOOD LIST

QTY	DESCRIPTION
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

* **Parts available from Hillcott Electronics:**

	QTY	DESCRIPTION
*	1	1/16" Wheel Collar (Du-Bro #137)
*	2	3/32" Wheel Collar (Du-Bro #138)
	1	3/32" diameter x 8.5" Music Wire (Axle)
	1	3/64" diameter 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 degree 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" diameter x 12" Threaded Rod (2 - 56 Threads on one end, Du-Bro #172)
	1	.062" diameter x 36" Music Wire (Sig MW-003)
	1	6" x 12" x .010" Acetate (for Windscreen, instruments)
*	1	Speedy Bee Wheel Set (two 3" and one 1" Trexler Balloon Wheel)
*	1	Trexler Pump for Inflating Balloon Wheels
	3	Rolls of Solartex Covering (2 rolls of a lighter base color, 1 roll of trim)

It is our opinion that the Speedy Bee will fly on electric power using the MFA Belt Drive or the Master Airscrew 2.5/1 gearbox driven by a 20 turn 540 "Wet Magnet motor". We currently have one in the pipeline which will be tried after the Sandown exhibition (no time at present) and we will inform anyone who is interested how the Speedy Bee performed on this motor unit with a 7 cell pack.
The motor and beltdrive with 9" x 6" prop is available from Hillcott Electronics for £34 or the motor with gearbox unit and prop is available at £35.
A suitable speed controller with BEC can be supplied for £36 instead of the usual price of £39.95 if purchased at the same time as the motor unit.