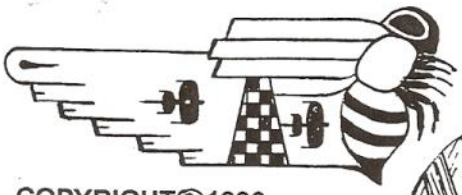

The Speedy Bee

CLANCY AVIATION
P.O. BOX 4125
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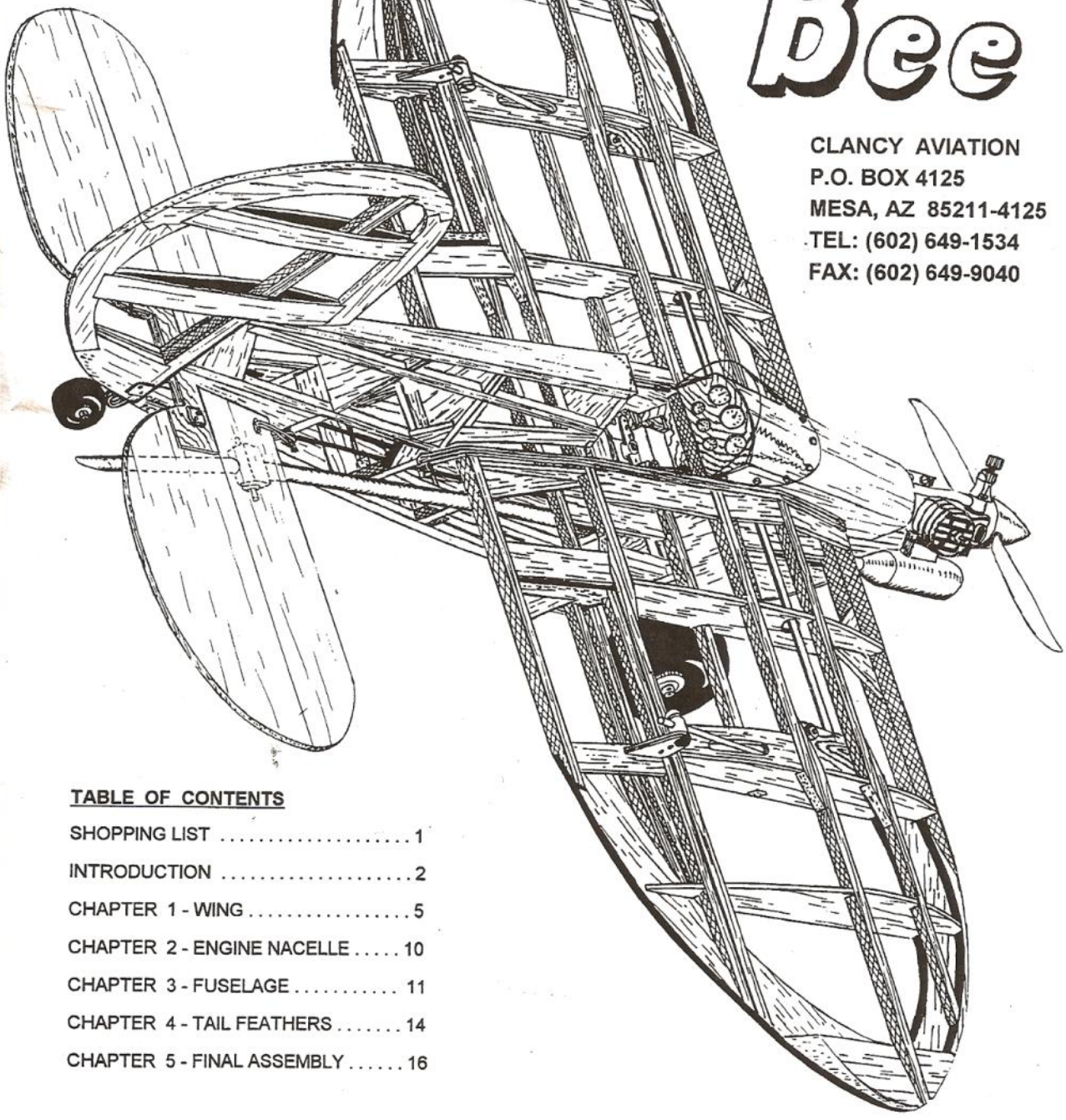


TABLE OF CONTENTS

SPEEDY BEE™ SHOPPING LIST

QTY	DESCRIPTION
1	4-Channel Radio, micro servos suggested
1	Motor .09 to .25 (2-cycle) or .20 to .26 (4-cycle) with mount, mounting screws, propeller, spinner, fuel tubing, & 4 oz Sullivan Flex Tank (slant type)
	OR, For Electric Power:
1	Model Electronics Turbo 10, 6:1 gear-drive motor, Master Airscrew 13" x 10" Electric Wood Prop,10-cell 1000 mAh Battery, & BEC Speed Controller

① aileron servo ③ elevator servo
② rudder servo
throttle / speed control
battery
motor
spinner

Hardware List

QTY	DESCRIPTION
1	1/16" Wheel Collar (Du-Bro #137) ✓
2	3/32" Wheel Collar (Du-Bro #138) ✓
9	Screws, No. 2 x 3/8" Socket Head Sheet Metal Screws (Du-Bro # 380) ✓
2	Large Nylon Control Horn (Du-Bro #366) ✓
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)

Items Available from Clancy Aviation

1	Speedy Bee Wheel Set: 2 size 9G (3") & 1 size 1 (1") Trexler Balloon Wheels ✓
1	Trexler Pump for Inflating the Balloon Wheels
3	Rolls of Easytex Covering (2 of a lighter base color, 1 of a darker trim color)
	OR, If you need to save weight:
3	Sheets of Litespan Covering (2 of a lighter base color, 1 darker trim color)
1	Jar of Balsaloc adhesive

SPEEDY BEE INSTRUCTIONS

INTRODUCTION

The Speedy Bee is the newest plane from Clancy Aviation. It is a 4-Channel, mid-wing R/C sport plane and it's truly a delight to fly! The hands-off stability, super-low minimum flying speed, and sprung landing gear make for great flying and smooth landings. The oversize control surfaces and high power-to-weight ratio make for incredible aerobatics: Knife-edge flights, steep side-slipping descents, and turns without banking are possible.

The Speedy Bee has a novel wing design with polyhedral on the bottom only - it is straight across the top. The plane is stable while flying upright - but, unlike conventional polyhedral wings, it is not unstable when flying inverted. Construction and covering are quick & easy.

SPEEDY BEE SPECIFICATIONS

Wingspan:	40"
Wing Chord:	14"
Wing Area:	475 sq in (3.3 sq ft)
Fuselage Length:	32" (includes rudder)
Weight:	42 oz (typical value)
Wing Loading:	12.7 oz /sq ft
Motor Requirements:	.09 to .25 2-stroke (or equivalent)
	.20 to .26 4-stroke

ENGINE SELECTION

I designed the Speedy Bee to handle a little more power and weight than the Lazy Bee. An .09 glow is the smallest recommended engine. The largest engine tested was the O.S. .26 four-stroke. A sport .25 two-cycle could be used only if the plane is extremely well built, and an oversized prop must be used (like a 10 x 4). With a .25 you should use the excess power ONLY for climbing, and NEVER for diving.

If I were buying a brand new engine for my Speedy Bee, I would choose a good two-cycle .15 and use an APC 8 x 4 prop. A .15 is right in the middle of the recommended engine sizes, and will not be under or over powered.

ELECTRIC POWER

So far, I have only tested the Model Electronics GT10 Turbo motor with a 6 to 1 gear drive on the Speedy Bee. I used a 7-cell 1300 mAh Battery Pack (Sanyo General Purpose Cells), and I also tested a 10-cell 1000 mAh battery pack with this motor. No BEC was used, although I do use a small (270 mAh) receiver battery pack. The test plane I used was covered with Easytex covering, although I do recommend the much lighter covering, Litespan, for electric planes. Litespan covering should save you 3 or 4 oz.

The performance with the 7-cell pack was sparkling with short take-offs from grass and an impressive climb. With 10-cells, the plane just leaped off the grass and the plane really hung on the prop.

(PG 2)

The electric combo that we developed for the Lazy Bee will probably fly the Speedy Bee well, if the plane is kept light. By covering with Litespan, using a light weight radio (mini or micro), and a small (250 to 300 mAh) receiver battery pack, you can keep the weight down. The performance will not be as spectacular as it is with the lighter 3-channel Lazy Bee. The Astro Flight .05 gear drive motor should work well also.

SERVOS

The Speedy Bee is designed for micro or mini servos. If you use a .15 or larger engine, the additional weight of standard servos should present no problem. Standard servos are a lot cheaper to use, but you will need to make a few modifications to use them. The biggest problem will be with the throttle servo. You will need to make a new servo mount. The aileron servo tray will need to have the servo mounting hole enlarged.

GLUE

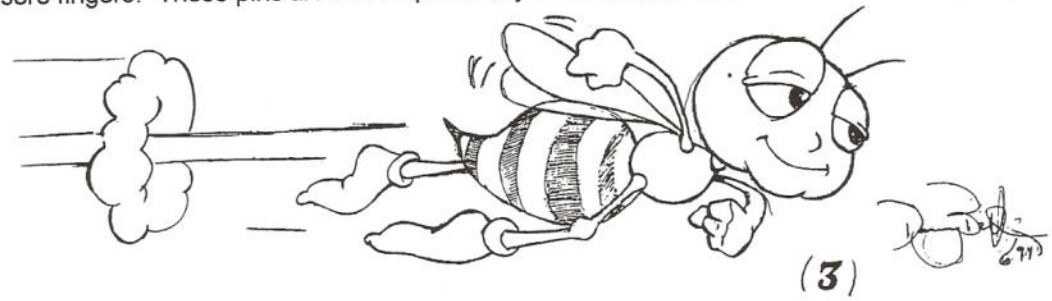
The glue I recommend is Thin CA (CyanoAcrylate). I personally use odorless glue. When other glues, such as white glue, are required, I will specifically mention it in the instructions. Otherwise, you can assume that the specified glue is thin CA.

Before gluing, always pin an assembly together as much as is possible. Then check the alignment and make sure everything is straight before dribbling CA into each joint. It is better to: "Pin, Pin, Pin, Glue" than to "Pin Glue, Pin Glue, Pin Glue" to reduce the time spent unclogging glue tips.

FLOATS

If you plan on flying your Speedy Bee on floats (on water or snow), you can use the same Lazy Bee float kit that is used on the Lazy Bee and Lazy Bee Special. Like the Lazy Bee, the Speedy Bee can switch from wheels to floats (or vice-versa) in under 5 minutes. If you do intend to fly your Speedy Bee on the water, be sure to seal all of the wood before you cover the plane.

The last thing I want to mention is that the pins shown in these sketches are the Modela modeling pins. I used to struggle with dressmaking pins before I found these. I remember having sore fingers and needing to use pliers just to push the pins into the wood, only to have the wood split on me! Now I can stick the Modela pins into plywood all day with no sore fingers! These pins are made specifically for modeling. Look for them in our catalog!



USING THIS MANUAL

Before you begin building your Speedy Bee, you should read and study this manual carefully from beginning to end. You should also study the plans carefully, and then acquire the items on your shopping list.

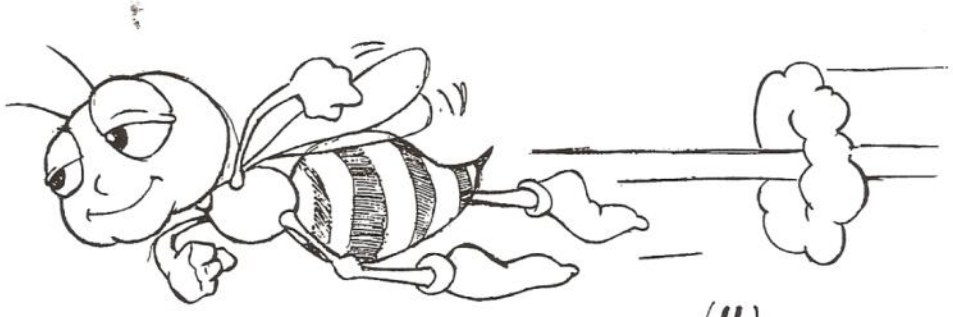
You should know that this book was written by referring to the plans. So, if there is a conflict between the drawings in this book and the plans, assume that the plans are correct. You should also be aware that the plans are subject to some distortion that occurs in the printing process and also from paper shrinkage/expansion. You should assume that the pre-cut parts themselves are accurate.

This instruction book assumes that the builder has some building experience. If you get confused about how to build something, you should study the drawings in this book and compare them to the top view, side view, and sectional view, etc. of the plane. If you have any questions, you can call me, Andy Clancy, at (602) 649-1534. If I'm not in, someone else may be able to help you, or you can leave a message with your weekday daytime phone, so I can return your call. I want you to build and fly your plane successfully.

I recommend the building sequence used in this instruction book, except that some sub-assemblies use slow-drying glue and could be done out of sequence to expedite the building process.

I have borrowed a few sketches from the original Lazy Bee Instruction Book ("To Build A Bee") because the information applies to the Speedy Bee as well. For example, the removable tail feathers, the electric motor mounting sketch, the shock absorbers sketch, and the extended exhaust pipe.

If you want an additional source of information for building the Speedy Bee, you may want to refer to the construction article I wrote for the July 96 RCM. There are some very nice photos of the Speedy Bee in various stages of construction. I have made some minor changes to the instructions since then, so if you find a conflict between the article and these instructions or the plans, assume that the article is incorrect.



CHAPTER ONE - WING

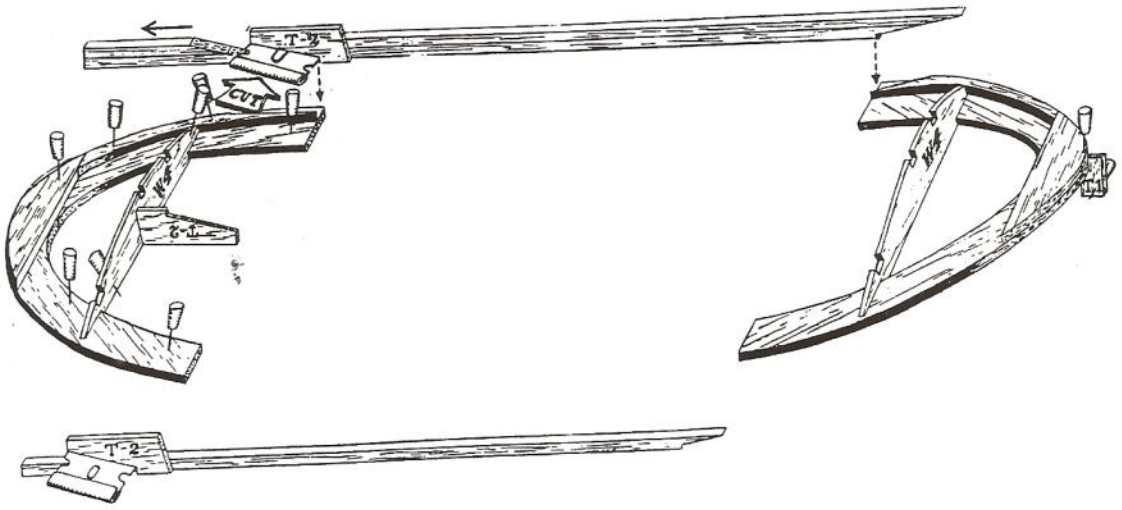
The wing is built directly over the plans. Pin or tape the wing plan to your building board. Cover the top view wing plan with clear plastic wrap. Use the parts drawings on the plan to identify the part numbers of the pre-cut parts.

STEP ONE

Build both wing tips flat over the plan. Use white glue to attach parts **WT1** through **WT4**, and pin in place to dry.

Select the three hardest and straightest balsa sticks to be the Leading Edge (LE), and Trailing Edge (TE) of the wing. Pick the hardest and straightest stick for the TE. Take the two remaining hard balsa sticks and laminate them together with white glue. Position the sticks so that the warps in one stick are opposed or mirrored by the warps in the other stick. This may make the laminating more difficult, but the Leading Edge will be straighter. Pin to the building board while drying.

Use part **T-2** as a guide to set the angle of the **W4** ribs in each wing tip. Then use **T1** to prop up both wing tips as shown (Note: the sketch only shows one wing propped up). Now cut the Leading Edge to length and use **T-2** as a guide to cut the correct angle at each end of the Leading Edge. Repeat for the Trailing Edge.

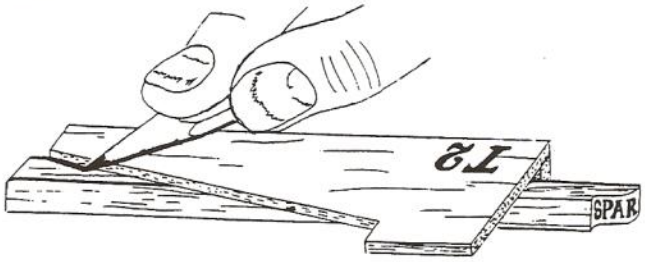


STEP TWO

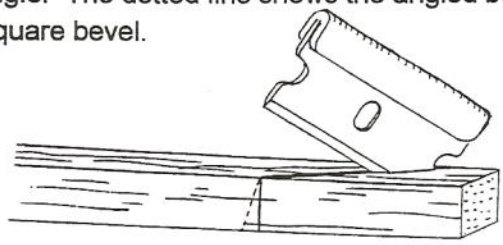
For this next step you'll need to bevel the ends of the spars where they meet the wing tips. Here's how you do the beveling:

A) Take part **T-2** and glue two scrap balsa sticks to it as shown in Sketch A. This is now your bevel tool.

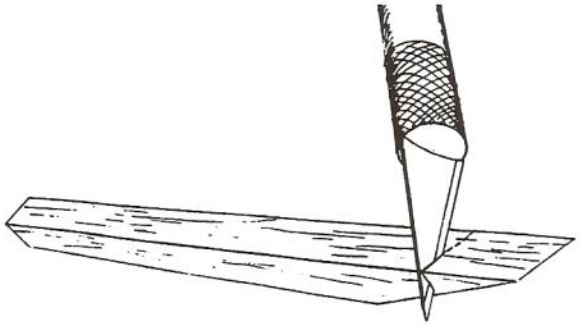
B) Sketch B shows how to use the bevel tool to mark the end of a spar for cutting.



C) Sketch C shows the end of a spar being cut as marked. NOTE: Some spars need to be cut at an angle. The dotted line shows the angled bevel, the solid straight line shows a square bevel.



D) Some spars will require the tip of the beveled end to be cut or trimmed off. All of this will have to be done by trial and error until a proper fit is achieved. Once you get one end done, then cut the remaining end as needed.



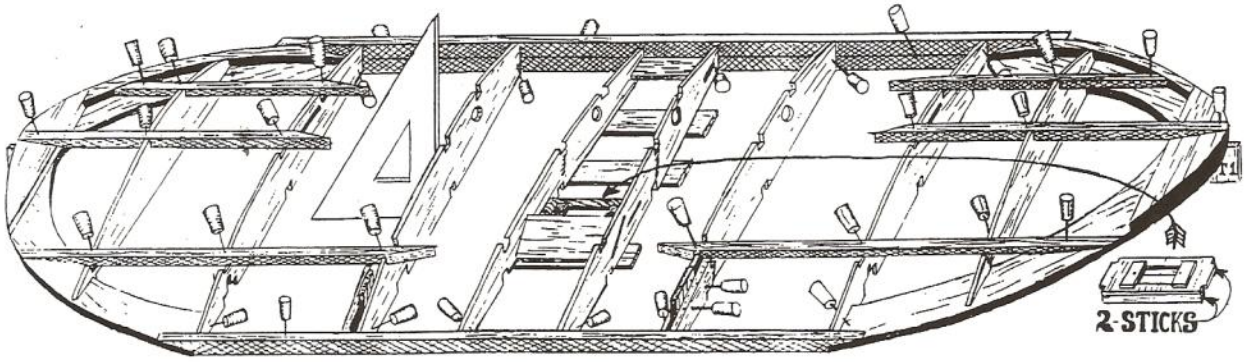
Now pin and glue the Leading Edge assembly into place on the plans. The center wing ribs have slots in them to accept tabs on the pilot shelf, throttle servo tray, and rib spacer. These should all be in place between the center ribs before the ribs are pinned in place on top of 1/16" balsa shims (the shims are used because of the cap strips). NOTE: The throttle servo tray should be assembled and the throttle servo should be test-fitted before installing the tray.

The center ribs will need to be "cracked" at the point where they intersect the main spar, because the ribs are slightly angled towards each other in front of the main spar. NOTE: "Cracked" does NOT mean broken, it simply means there is a precise joint or bend or crack in the wood at a point. The proper way to "crack" wood is explained below.

After you have marked the point where you want the crack, hold the wood with the marked line for the crack laying along the sharp edge of a desk or table. Hold both sides of the wood very close to table edge. While holding the side on the table flat; slowly start applying gentle pressure to the side that is off the table (be sure you are applying the pressure right next to the edge). Carefully bend until the first crack is formed. Do NOT bend any further! You should practice this technique with some scrap pieces of balsa, before starting on your pre-cut ribs.

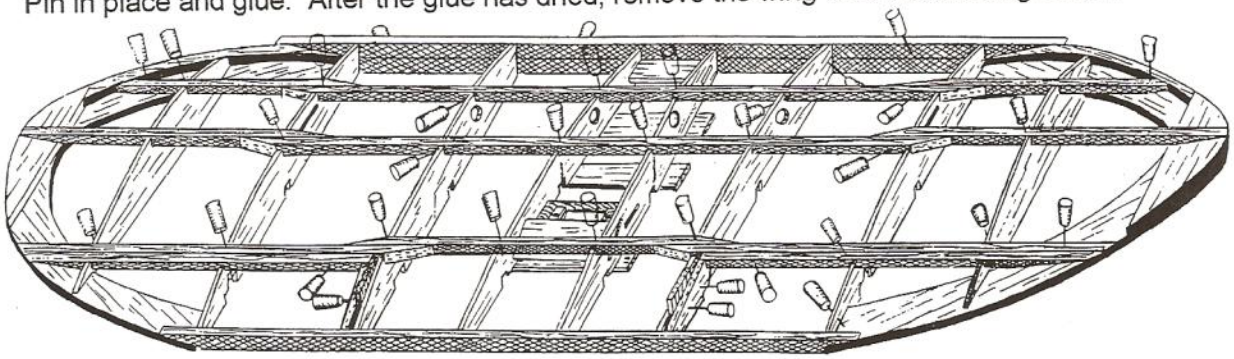
After the center ribs are cracked and pinned in place, install the remaining ribs as shown in the plan. Then pin the Trailing Edge in place, and then the rest of the spars. Now glue everything in place, making sure each rib is vertical (You can use a triangle as shown) before you glue it into place. Use a 1/16" shim to position the aileron end ribs (**W5**).

NOTE: All the spar sizes are shown on the plans.



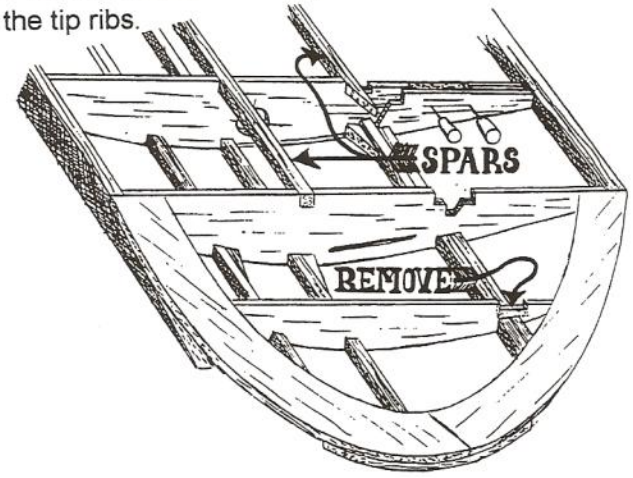
STEP THREE

Now install the remaining top spars in the wing. Select the hardest one for the main spar. Pin in place and glue. After the glue has dried, remove the wing from the building board.



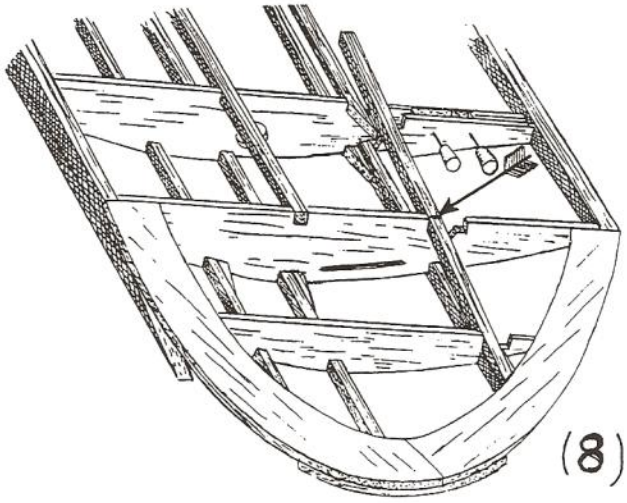
STEP FOUR

Flip the wing over. Make the two bottom center spars out of the hardest balsa sticks. Cut the rear spar notches in the tip ribs.



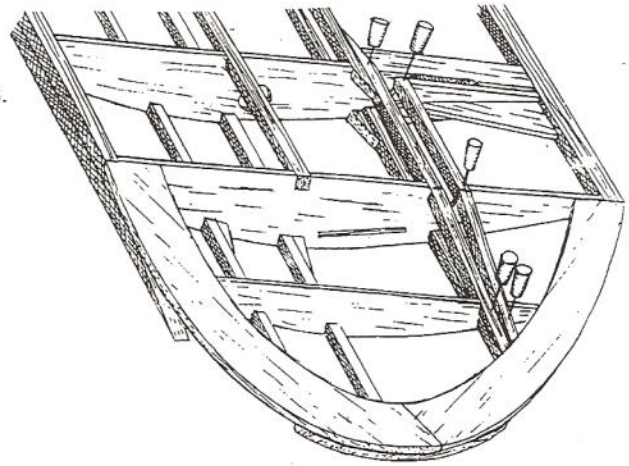
STEP FIVE

Cut and bevel the end of a stick for the rear spar and mark where it meets rib **W3**. Remove and crack at this point (Use the same careful method explained in Step Two) and cut to length and glue it in place.



STEP SIX

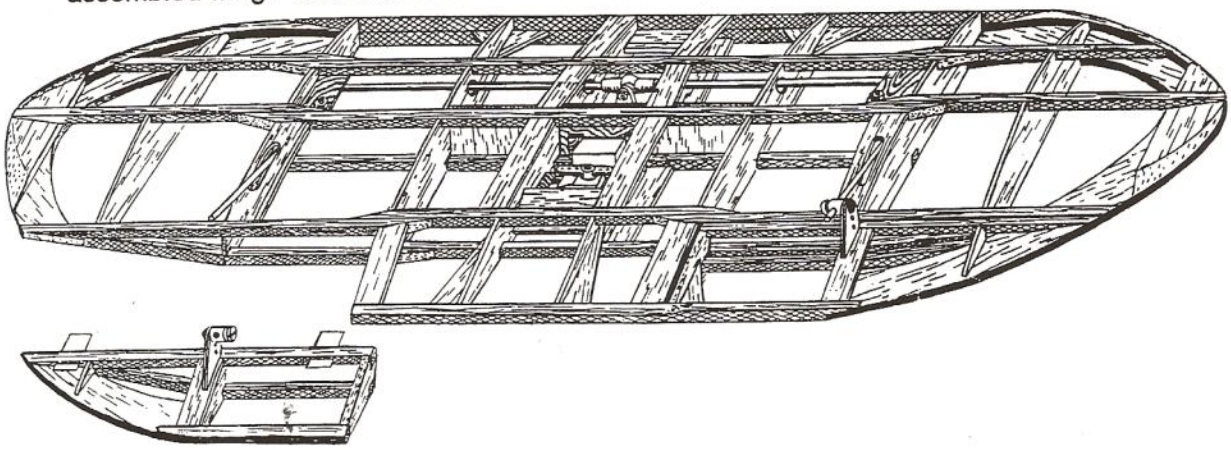
Fit and install the remaining wing tip spars. The bottom of each wing tip should now look like the sketch to the right.



STEP SEVEN

Assemble the plywood aileron servo tray. Test-fit the servo before installing the tray. Assemble and install both plywood bellcrank supports. The pre-cut cap strips that have the push rod exit require a doubler made of scrap balsa to be glued to them before they are installed in the wing. Install all the cap strips and the pre-cut gussets and shear webs.

Test-fit the aileron servo and linkage. The bellcrank screws will need to be shortened. Use a Dremel tool to cut the screw with the nut still on while it is installed in the wing. Do NOT cut the ailerons away until the wing has been sanded to shape. The control horns and push rods should be removed during sanding. My sketch shows a completely assembled wing. One side has been sanded to shape and the aileron has been cut away.



STEP EIGHT - SHAPING 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 process. You can use this method for shaping the rounded wing tips, just do the work in small sections. Do the finish sanding with 120 grit sandpaper.

CHAPTER TWO - ENGINE NACELLE

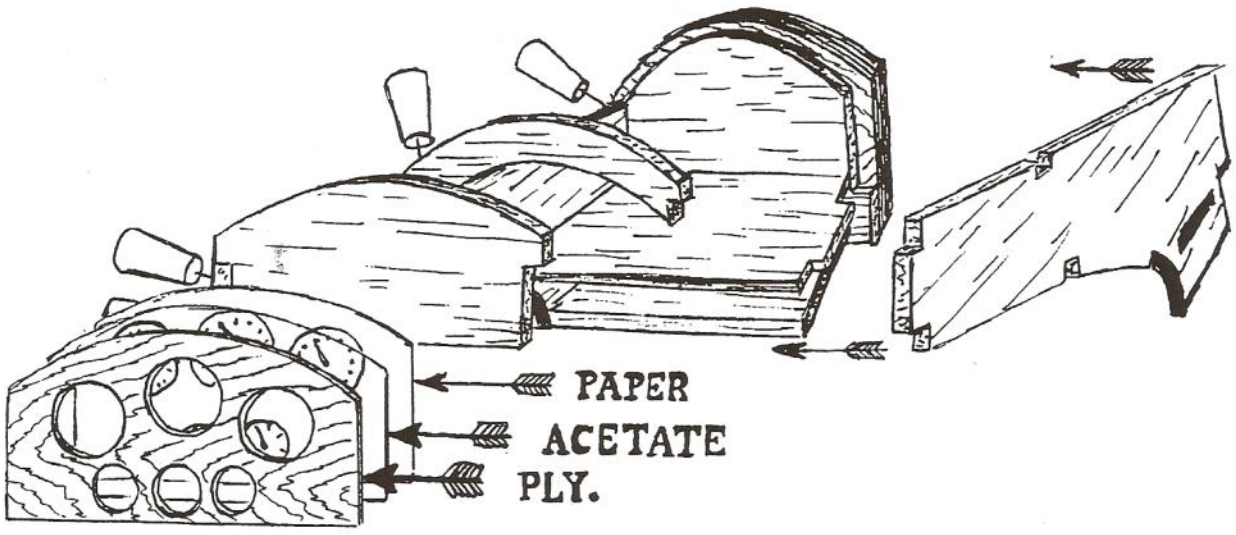
BUILDING SEQUENCE

The building sequence is important on the Speedy Bee, because you need to have the wing built first. I recommend that you follow the building sequence in this instruction book. 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 you are welcome to try and 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 gas tank shelf should now be fitted into the locating slots of the 1/8" nacelle sides. Now pin the firewall **NF3** and the nacelle formers in place panel in place between the nacelle sides. Make sure the nacelle fits on the wing before you dribble thin CA into all the glue joints. Use two layers of flexible 1/16" sheet balsa for the nacelle top sheeting. After the nacelle has been covered, the instrument panel can be installed.

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.



CHAPTER THREE - FUSELAGE

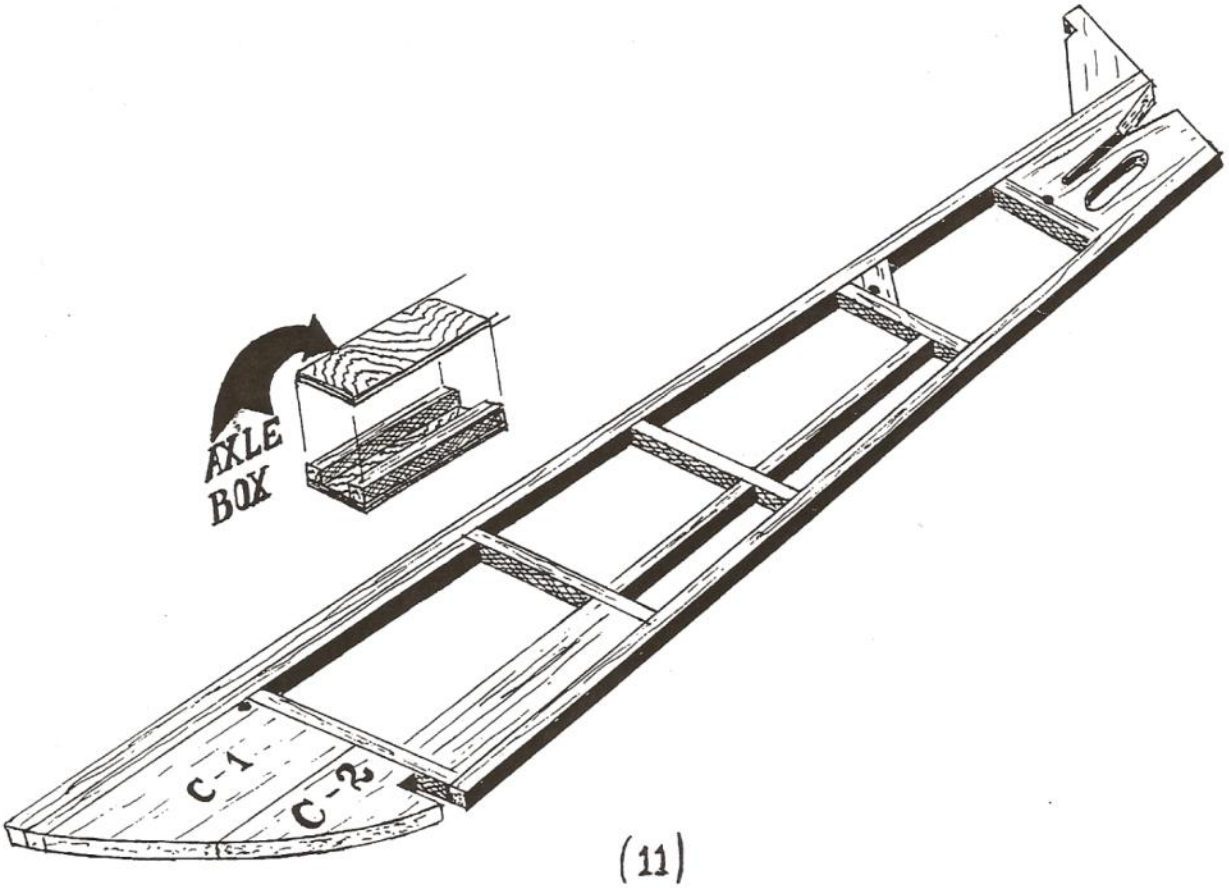
STEP ONE

The first fuselage side frame is built over the side frame drawing on the plans. Do NOT use the side view of the fuselage, because the side view shows the *projected* length of the side frame in the completed fuselage. This length is shorter than the actual side because the sides are curved.

Cut all sticks to length for both side frames at the same time. Build the first side frame, then *remove* it from the plans, and flip it over. Now build the second side frame over the first side. Be sure to flip the first side over, or you may make two identical sides instead of a left side and a right side. Before you separate the two finished sides, drill the holes for the wing, rudder, and stabilizer dowels.

Now notice that the glue bumps tend torward the side of each frame that was facing the plastic wrap on your building board. The sides with the glue should face inwards on the plane. Carefully sand the outer side of each side frame.

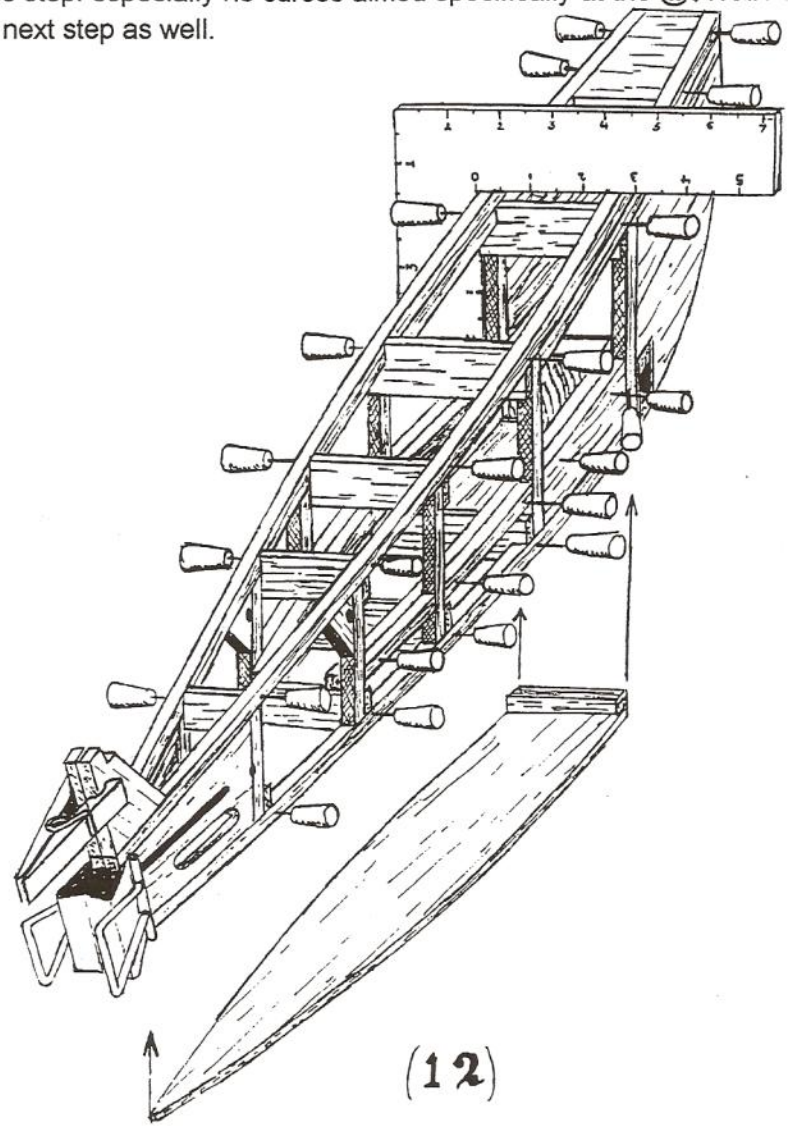
Assemble the axle box. First cut, then epoxy the two hard balsa sticks to the first plywood part and let dry. All the inner surfaces of the axle box should be coated with epoxy before the second plywood piece is glued into place.



STEP TWO - BOXING UP THE FUSELAGE

Start by getting a helper. Glue the stick to the belly sheet. Then clamp both soth sides frames together at the tail post. Before the pre-cut cross members are pinned in place, you need to realize that the pre-cut belly sheet fits between the lower fuselage longerons and NOT below them as is the normal practice. The bottom cross members are cut undersize to allow for the bottom sheeting. Also, take notice that some of the cross members are forward or aft of their uprights.

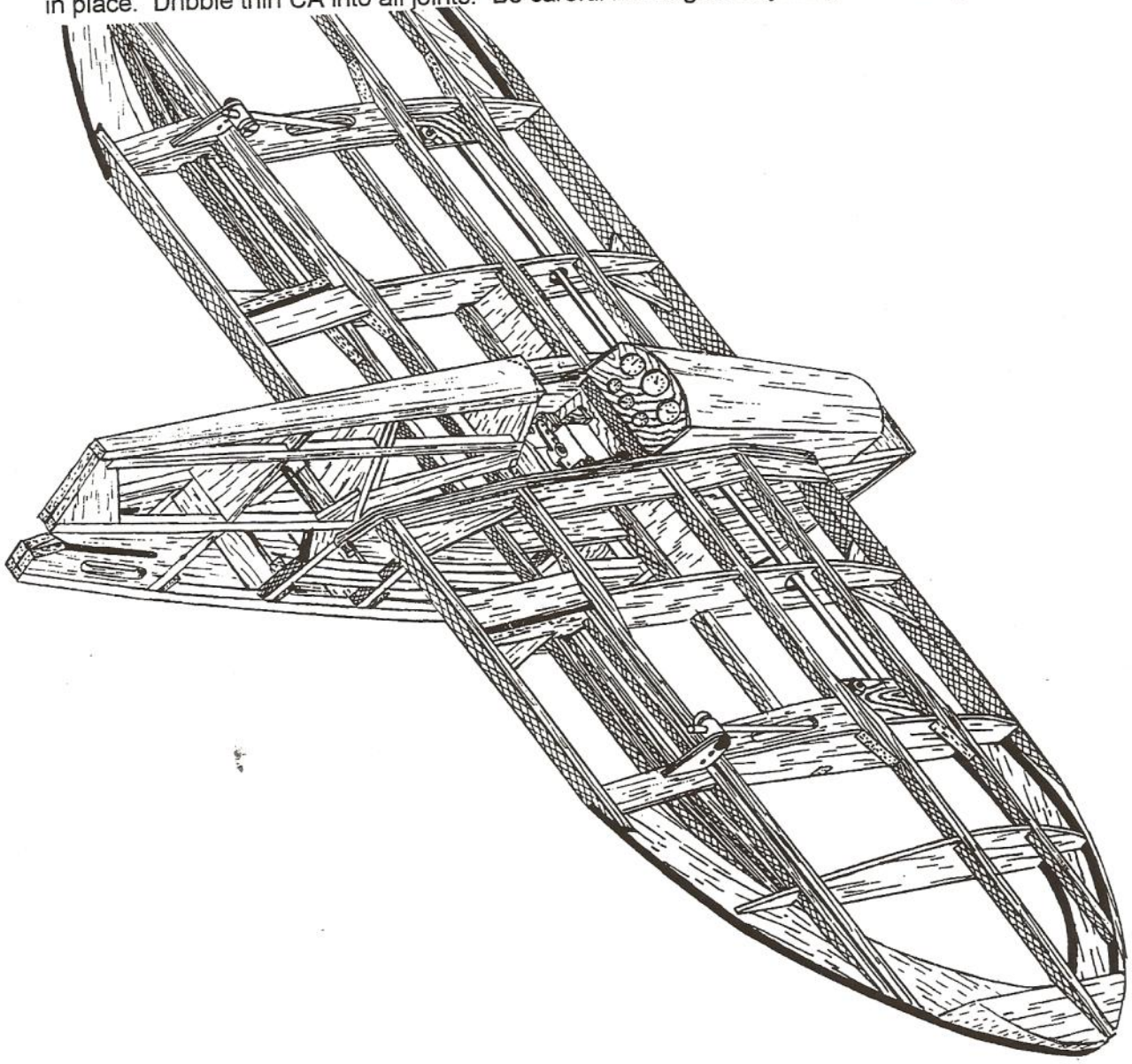
All the cross members, the axle box, and the belly sheeting should be pinned in place. Before gluing, check each of the cross sections for squareness, then glue them in place. In addition to the pins, rubber bands may be carefully stretched around each station if difficulty is caused by longerons springing the pins loose. You'll have to get the bottom sheet in position before rubber bands are used. Next, sheet the bottom of the nose with two layers of 1/16" sheet balsa (crossgrain). I would be pleased to learn that there was no swearing during this step. especially no curses aimed specifically at the @$%&#! designer. This applies to the next step as well.



STEP THREE

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.

All turtle deck formers require beveling on top before they are pinned in place on the wing and fuselage. Next, the spine, which is a pre-cut 3/16" balsa part, should be marked where the formers touch it and then pinned in place on the assembly. The top of this part will be round. You may want to shape it before you pin it in place. Pin the remaining parts in place. Dribble thin CA into all joints. Be careful not to glue anything to the wing.

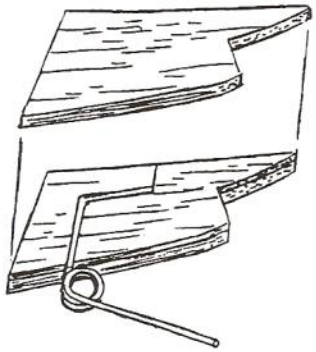


CHAPTER FOUR - TAIL FEATHERS

BUILDING THE RUDDER

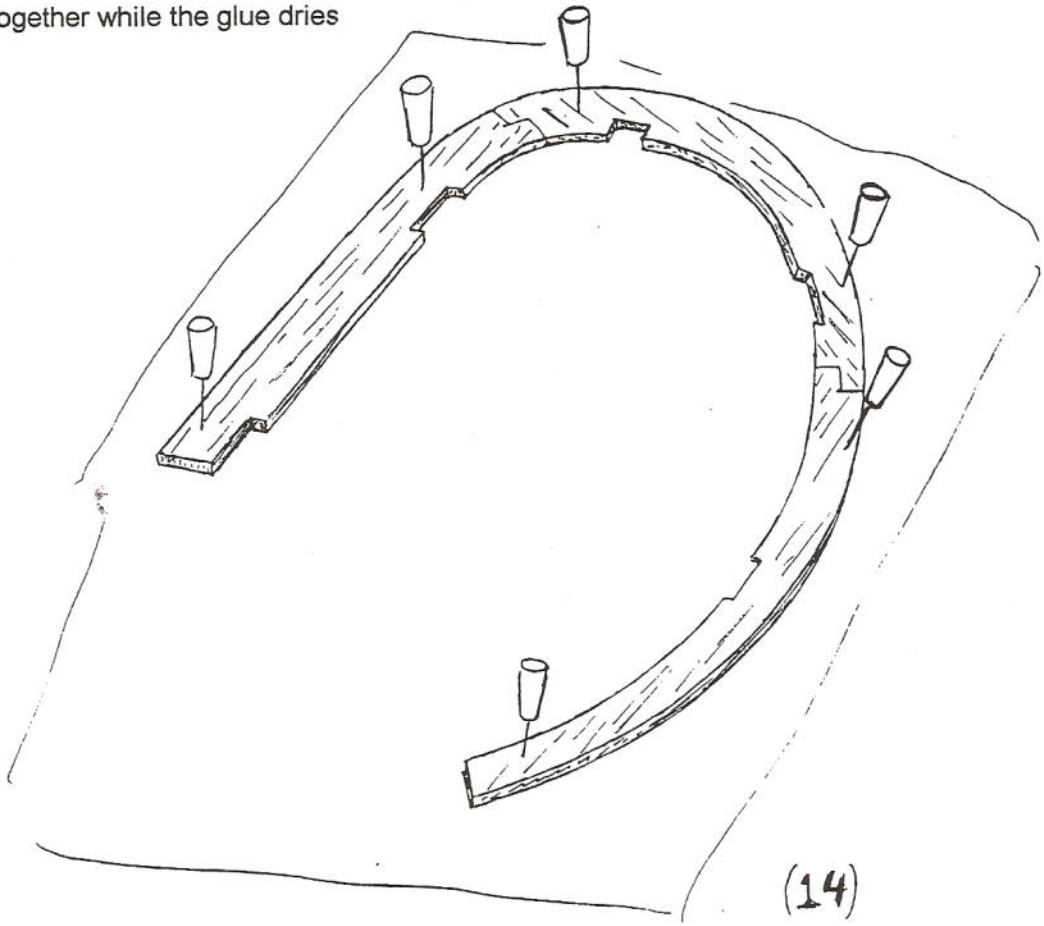
STEP ONE

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 sketch shows this about to be done.



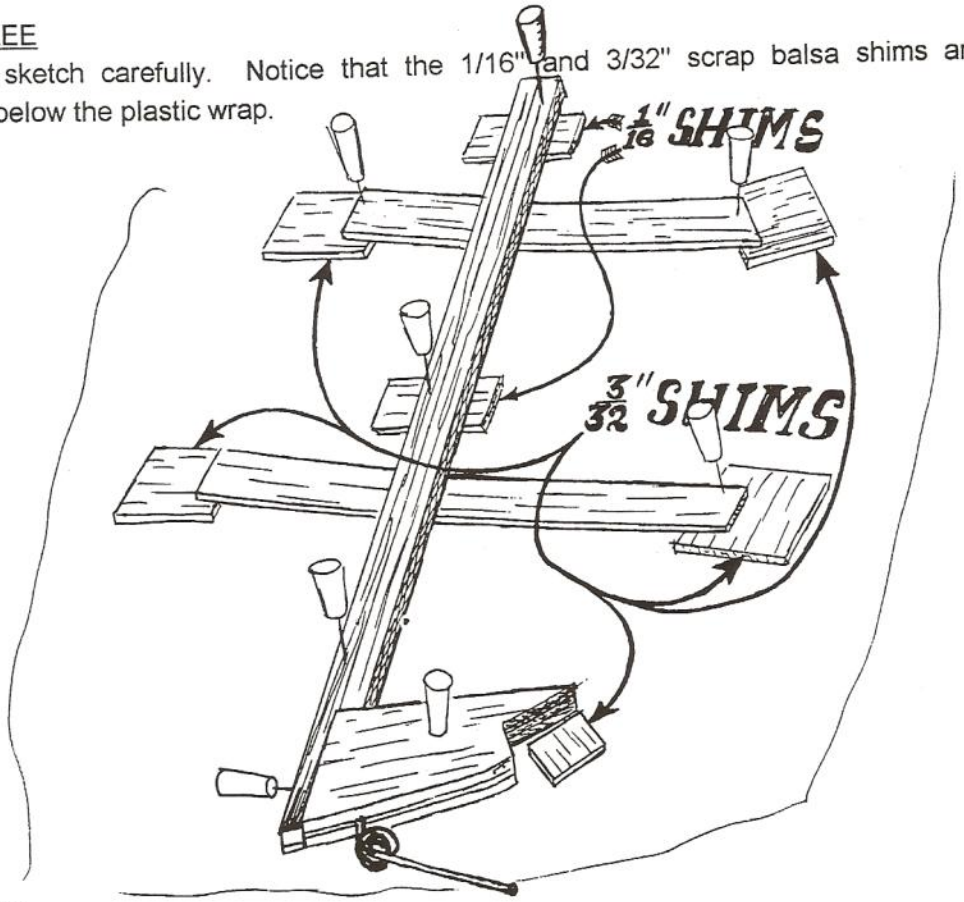
STEP TWO

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



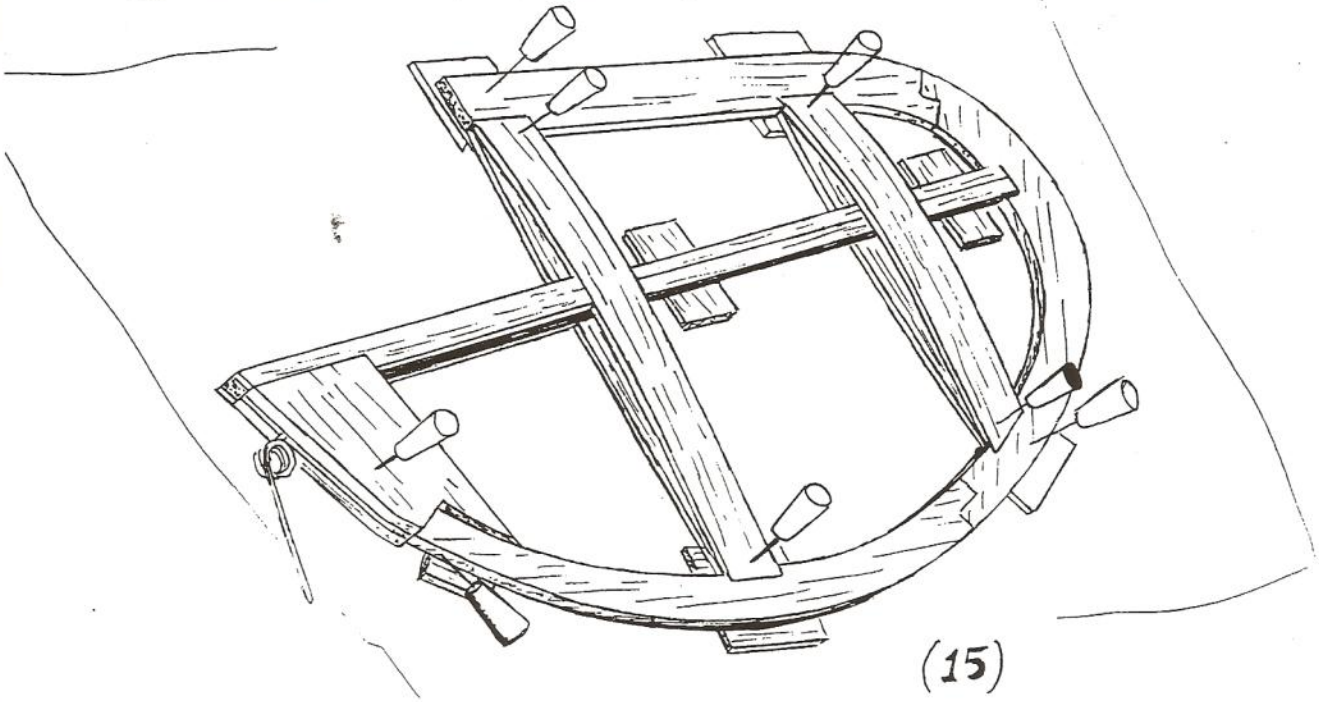
STEP THREE

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



STEP FOUR

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



CHAPTER FIVE - COVERING & FINAL ASSEMBLY

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 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.

If your Speedy Bee has a smaller gas engine (under .15) or if you are using electric power, saving weight is important, so you may want to use Litespan, our light weight covering. You can save 3 or 4 oz by using Litespan. Litespan requires a special adhesive: Balsaloc.

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.

CONTROL THROWS

The elevator and rudder should each have a control throw of 3/4" in each direction, measured at the trailing edge of the control surface. The ailerons should have a 1" control throw, measured at the trailing edge of the aileron.

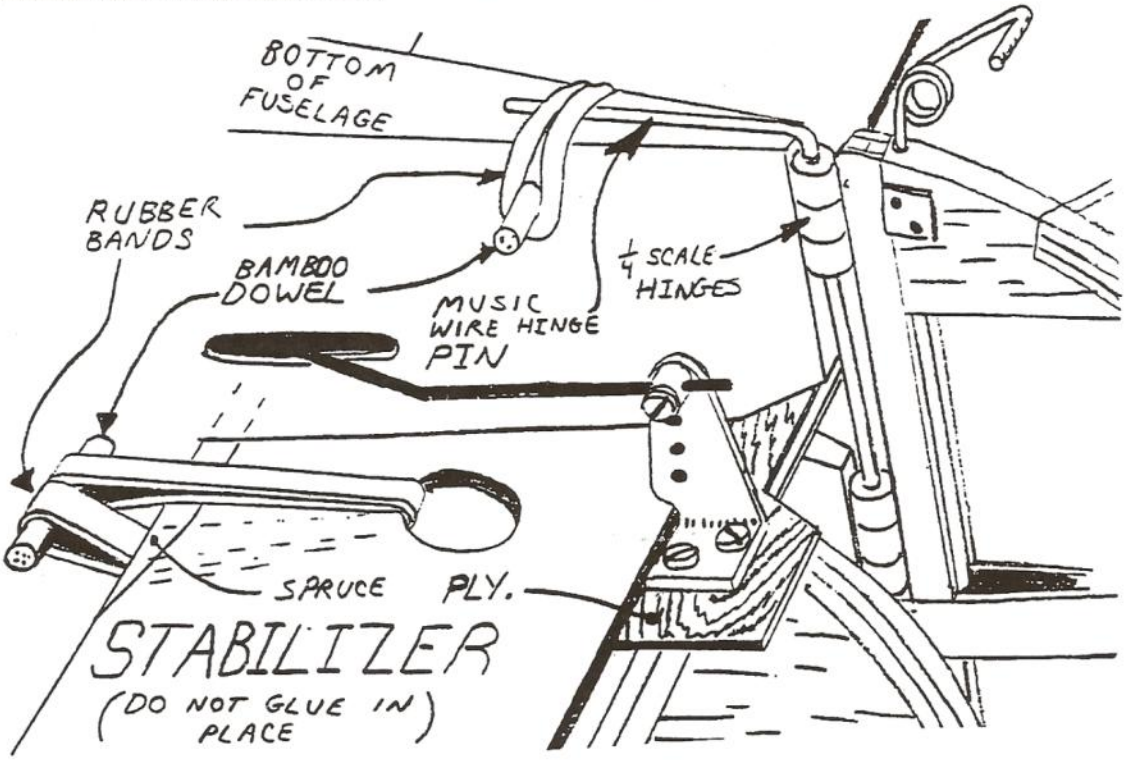
The engine should be mounted square to the firewall; two degrees of right thrust is optional. Add downthrust only if the plane stalls at full throttle. The Speedy Bee should climb steeply at full throttle. If the model balloons upward when going from full throttle to idle, you should add some upthrust.

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!

REMOVABLE TAIL

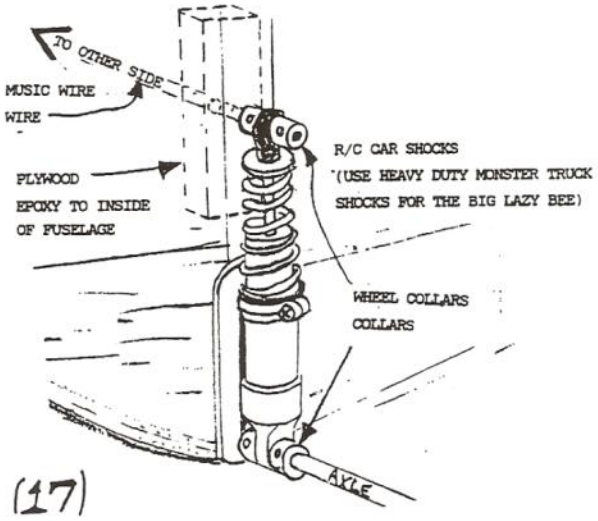
A removable tail on your Speedy Bee or Lazy Bee makes storage, transport, and repairs easier to accomplish. In addition, the rubber band mounting for the stabilizer makes it less likely to be damaged in a crash. I use two #30 rubber bands per side to attach the stabilizer and the long rudder hinge pin is held in place by two #30 rubber bands.

The drawing below shows the removable tail of the Lazy Bee, but the installation details are the same as on the Speedy Bee. The plans show where to position everything. When you glue the rudder hinges in place, you should have the covered stab in place.



HEAVY DUTY SUSPENSION

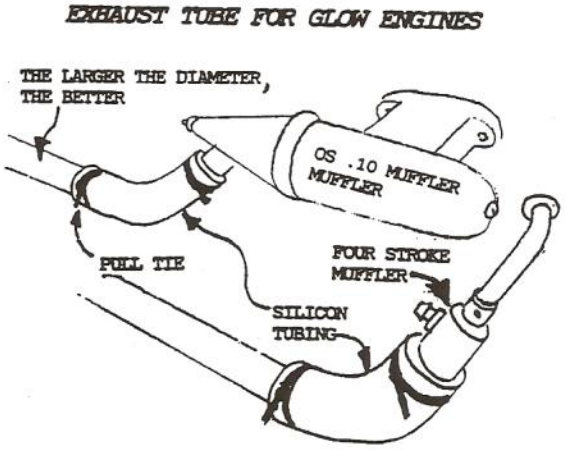
A few guys have done this modification to their Big Lazy Bees or Speedy Bees and are very happy with the results. This provides better shock absorption than the standard set-up. I think it is such a good idea that I use it on my Speedy Bee and my Big Lazy Bee. You can see it in our new video. I use a special spring with oil-damped Monster R/C Truck Shocks. We sell the Heavy Duty shocks for $30.

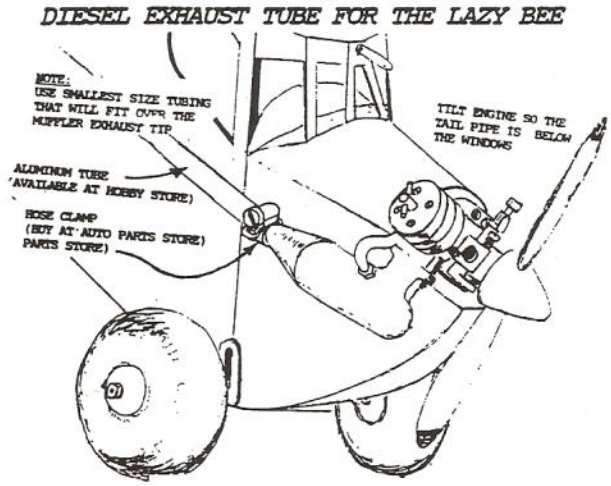


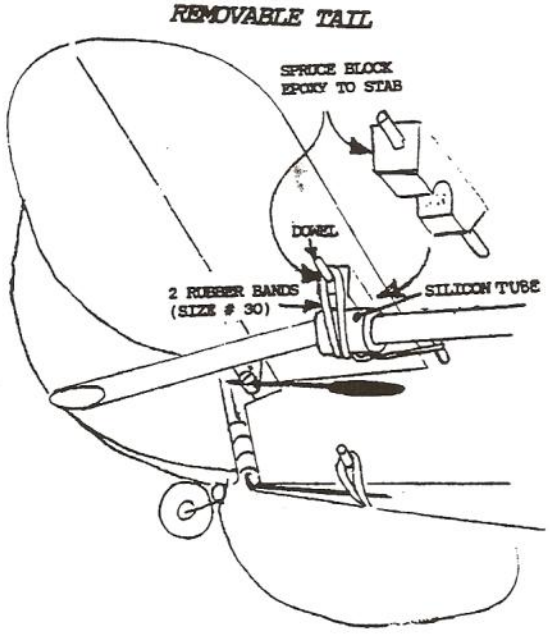
SPEEDY BEE WITH EXTENDED EXHAUST PIPE

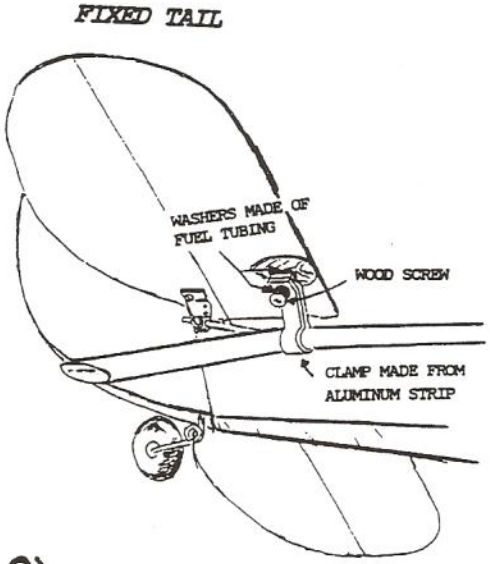
Many builders have noticed the long exhaust pipes on some of the Lazy Bees and Speedy Bees in our videos and advertisements. On these planes the exhaust pipe runs from the end of the muffler out to (and under) the stabilizer. Both diesel and 4-stroke engines work well with extended exhaust pipes. However, 2-cycle engines are very sensitive to back pressure, so your pipe needs to be large enough to avoid back pressure.

The extended exhaust is designed so that the oily exhaust is dumped out below the elevator instead of getting sprayed all over the covering. All that you need to build an extended exhaust is some aluminum tubing, a small automobile hose clamp, and a clamp to attach the exhaust tube to the stabilizer. If you cannot find good aluminum tubing, we sell an aluminum pipe with an inner diameter of 3/8" and an outer diameter of 1/2". The tubes weigh 3 oz and they are around 34" - 35" long. The tubes cost $6, plus S & H.









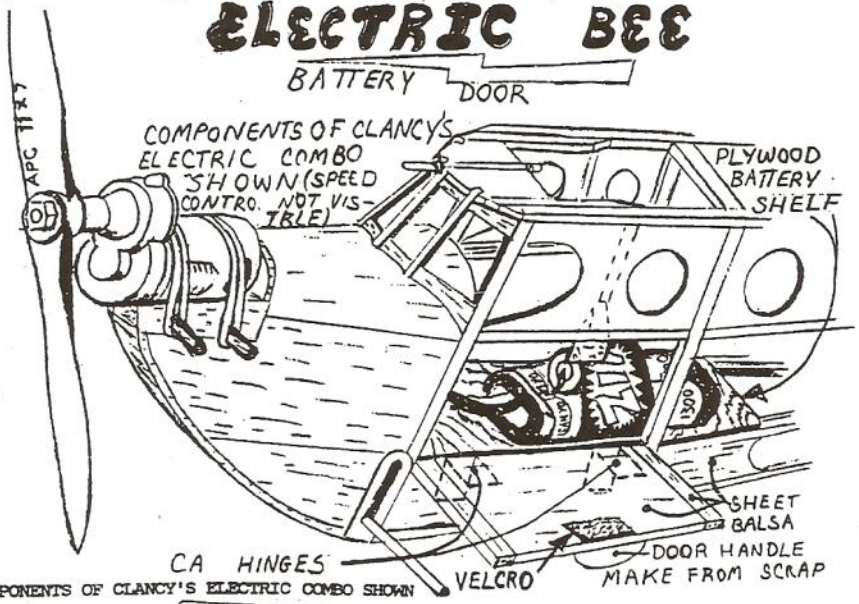
WHY ELECTRIC?

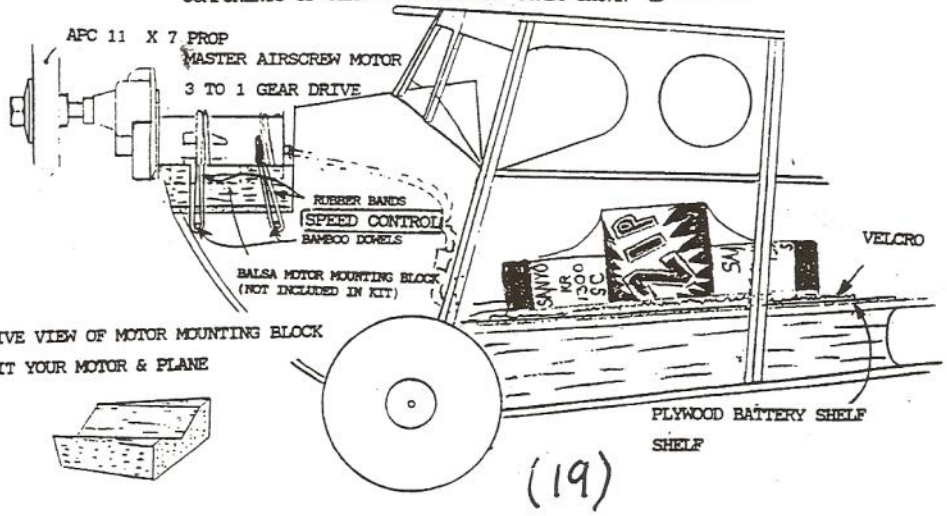
There are a lot of good reasons, here are a few: 1) Because it's reliable - more reliable than the car I take to the flying field. 2) Less frustration. 3) It's clean, so there's no need to coat a beautiful plane with oil. 4) It's quiet and has plenty of power (Seeing is believing, check out our video!)

I have six battery packs; each one gives 6 minutes at full throttle. I can change the battery pack in 1/4 the time it takes to refuel and restart a glow engine. The cost is comparable - A .15 motor, mount, prop, glow plug, a micro-servo for the throttle, throttle cable, and a can of fuel costs more than our Deluxe Electric Combo deal with the battery charger!

If you have never used electric power before, you might want to consider trying it on our Lazy Bee, or with the Speedy Bee. Electric power is a lot cheaper and more efficient than it used to be. The Lazy Bee performs so well as an electric that people often ask me what kind of muffler I'm using! Consider the advantages: No mess, No noise, No trouble starting the motor, great reliability, and you can fly when and where you want!

NOTE: This Motor Mount, Battery Mount, & Access Door can be used on the Speedy Bee.





PERSPECTIVE VIEW OF MOTOR MOUNTING BLOCK CUT TO FIT YOUR MOTOR & PLANE