



Andy Clancy's Stagger Bee Build Description

Updated as of 20 November 2024

The Stagger Bee captures the special classic grace of a Stagger-wing Beechcraft. It is a fun 29" top and 23.5" bottom wingspan three channel sport biplane, which is still very much a Bee. You know: Oversized control surfaces, hands-off stability, extremely low minimum flying speed, and easy aerobatics. The Stagger Bee is just a Bee that is a biplane. It can manage having more power than a Lazy Bee.

Stagger Bee Model Specifications:

Wingspans: 29" top and 23.5" bottom. (Note - I will modify top wing for a 37" wingspan)

Wing Chord: 10"

Total Wing Area: 395 sq. in. (475 sq. in. with my modified top wing)

Stabilizer Span: 18.5"

Total Stab Area: 106 sq. in.

Fuselage Length: 24 - 5/8"

Rec. No. of Channels: 3 - Throttle, Elevator, and Rudder. (Note - I will add flaperons to the top wing)

Weight: 30 oz. to 42 oz. depending on power system selected.

Glow engines: from .061-.15 two-stroke or up to .30 four-stroke.

Electric: Output of 250 - 600 watts, 3-cell LiPo pack sized up to 4,000 mah.

An Example of a Nice Stagger Bee Build.



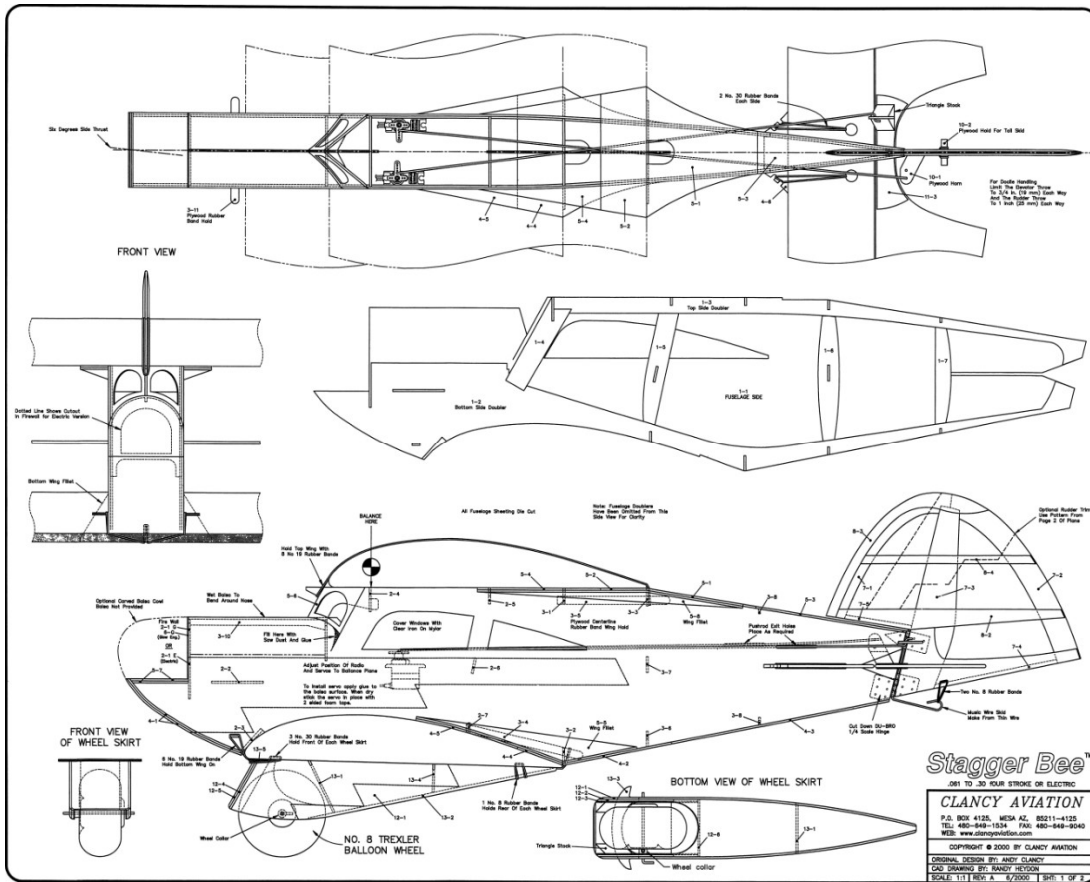
Image Source: <https://www.rcgroups.com/forums/showthread.php?2681389-Clancy-Aviation-Stagger-Bee-Build/page6>.

Clancy's Stagger Bee is designed to fly with glow engines as small as a .061, and strong enough to manage larger engines up to .15 sport two-cycles or even up to .30 four-cycles. With larger engines it will have vertical capabilities.

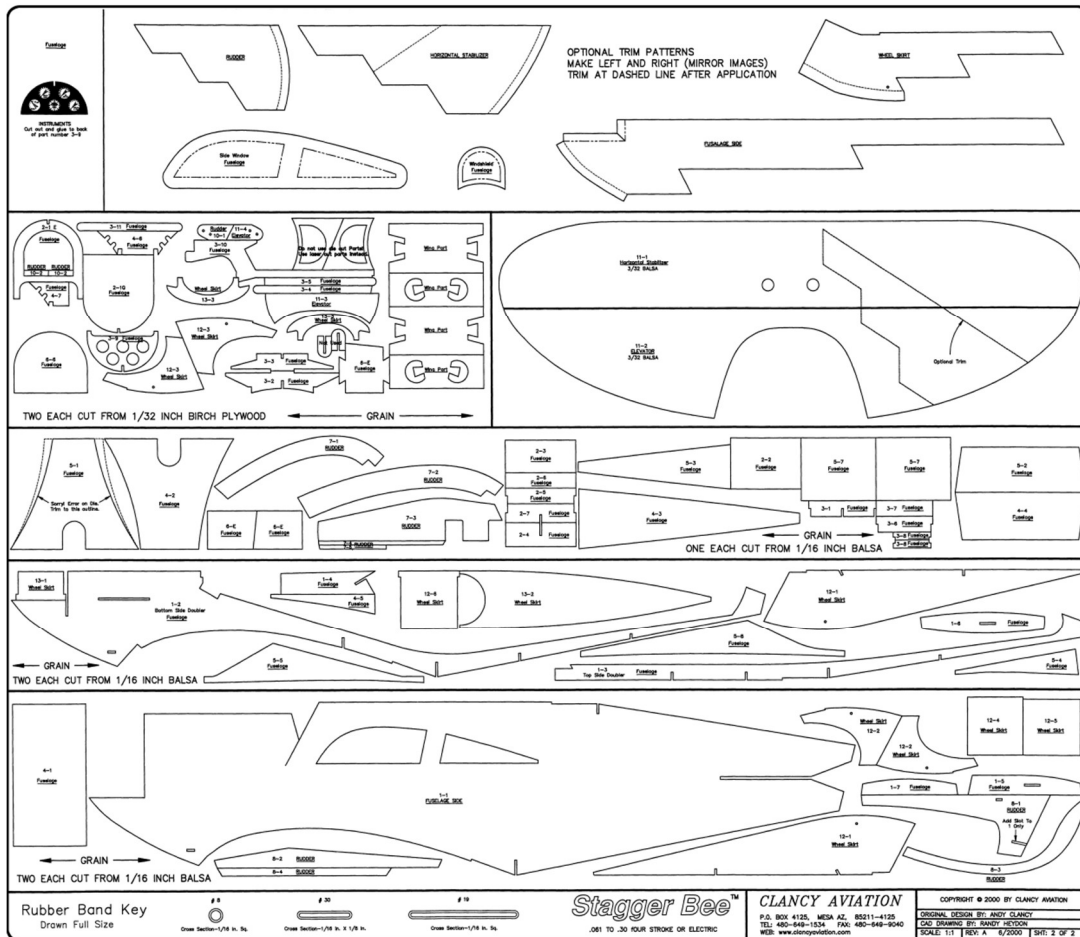
An electric-powered Stagger Bee typically will have a total flying weight of around 30 to 40 ounces ready to fly. It is recommended you use motors with a power output of 250 - 600 watts. The electric Stagger Bee tends to be tail heavy with brushless motors. You might want to use an oversize motor to help balance the plane even though you do not need the extra power. Larger motors can be detuned by throttling them down, or by using a smaller prop than specified for the motor, or by not using the maximum number of cells. The best battery size to use is a 3-cell LiPo pack up to 4,000 mah. **Be sure to decide on the power plant and other options before you glue the first piece!**

I found a good Stagger Bee build log that lists several modifications needed, which I plan to use in my build. You can find this build log on the RC Groups website @: <https://www.rcgroups.com/forums/showthread.php?2681389-Clancy-Aviation-Stagger-Bee-Build>,.

Andy Clancy Aviation Stagger Bee plans, assembly manual, and an RCM review can download from Aerofred.com @: https://aerofred.com/details.php?image_id=91104, and/or Outerzone.co.uk @: https://outerzone.co.uk/plan_details.asp?ID=3705.



Images Source: Extract from the Andy Clancy Aviation Stagger Bee Plans.



Using the Stagger Bee plans, I determined what materials I will need to make my scratch build. Once I have a complete wood and material list, any balsa sticks and sheets, basswood, and plywood needed are ordered from Balsa USA (<https://balsausa.com/>). The four Hitec HS-81 16.6g Nylon Gear Analog Micro Servos, Spektrum AR620 6-Channel RC Sport Receiver, Gold-in-Rod control rod set, main landing gear wheels, steerable tail wheel assembly, and all other required hardware can easily be located on the web or purchased from your local hobby shop. Since I will increase the span of the top wing and adding flaperons, to power this little beauty I plan to use a BadAss Power System that puts out 566 watts, which is equivalent to a .25 two-cycle glow engine. Yes, *I am building an electric powered model. I know that is hard to believe.* This system is comprised of the following components: - Motor: BadAss 2814-1560Kv Brushless; ESC: BadAss Rebel V2 Series Brushless ESC, 60A; Battery: BadAss 45C 3,300mah 3S LiPo; Prop: APC 9x6 E-Series. You can purchase the system from “Innov8tive Designs” at <https://innov8tivedesigns.com/>. Stagger Bees can use #8 Trexler Wheels, which you can purchase through “Andy Clancy Designs” at <https://www.andyclancydesigns.com/>.

The “Stagger Bee Materials and Hardware List” below contains all materials and hardware required to build my Stagger Bee. I will update this list as I proceed through the build.

Stagger Bee Materials and Hardware List

Amount	Description	Use
Balsa		
7	1/16” x 4” x 36” med. balsa sheet	various fuselage, wheel skirts, vertical stab./rudder parts
3	3/32” x 3” x 36” med. balsa sheet	wing ribs, tips, horizontal stab/elevator parts
2	3/32” x 7/16” x 36” med. balsa sticks	top and bottom wing leading edge
2	3/32” x 1/2” x 36” med. balsa sticks	top and bottom wing leading edge
2	3/32” x 3/4” x 36” med. balsa sticks	top and bottom wing trailing edge
2	1/8” x 1/8” x 36” med. balsa sticks	top wing aft spar, flaperon leading edge
2	1/8” x 1/4” x 36” med. balsa sticks	top wing aft spar, flaperon leading edge
1	3/8” x 36” triangular balsa stock	firewall backup brace, bottom wing bracing
Basswood		
2	1/8” x 1/8” x 24” basswood sticks	top and bottom wing front spar
2	1/8” x 1/4” x 24” basswood sticks	bottom wing spars
2	1/8” x 1/4” x 36” basswood sticks	top wing spars
2	1/8” x 3/8” x 24” basswood sticks	bottom wing main spars
2	1/8” x 3/8” x 36” basswood sticks	top wing main spars
1	1/4” x 1/4” x 12” basswood stick	flaperon servo bay rails
Plywood		
1	1/64” 3-ply model aircraft grade birch plywood	strengthen rudder/elevator control horn mounting areas
1	1/32” 3-ply model aircraft grade birch plywood	various wing, fuselage, and wheel skirt parts
1	1/16” 3-ply model aircraft grade birch plywood	flaperon hatch covers
1	3/32” 5-ply model aircraft grade birch plywood	top and bottom wings, electric version firewall
1	1/8” 5-ply model aircraft grade birch plywood	steerable tailwheel mounting plate
1	1/4” 5-ply model aircraft grade birch plywood	top and bottom wing mounting plates
1	3/8” 7-ply model aircraft grade birch plywood	top and bottom wing mounting bolt blocks
Flight Control System		
1	Spektrum AR620 6-Channel RC Sport Receiver	2.4GHz DSMX receiver
4	Hitec HS-81 16.6g Nylon Gear Analog Micro Servo	servos for all control surfaces
2	8” Servo Lead Extension	flaperon servo leads
Electric Power System		
1	BadAss 2814-1560Kv Brushless Motor	
1	BadAss Rebel V2 Series Brushless ESC, 60A	

- 1 BadAss 45C 3,300mah 3S LiPo Battery
- 1 Battery Adapter - XT90 Male to XT60 Female
- 1 APC 9x6E Propeller

Miscellaneous Items

- | | | |
|----------|--|---|
| 1 | Du-Bro #275SL 2.75" Wheel Set | MLG wheels |
| 1 | 5/32" x 12" music wire | MLG axles |
| 4 | Du-Bro #140 5/32" Wheel Collars | MLG |
| 1 | Du-Bro #955 Semi-Scale Tailwheel System | fuselage tailwheel |
| 1 | Du-Bro #164 10-32 Nylon Wing Bolts (set of 4) | top and bottom wing mounting bolts |
| 2 | Du-Bro #125 Mounting Bolts & Blind Nuts (set of 4) | MLG wheel skirts mounting bolts |
| 1 | Du-Bro #179 Socket Head Bolts With Lock Nuts | motor cross brace to firewall mounting |
| 1 | TBD size solid plastic tubing | motor cross brace to firewall spacers |
| 12 | Du-Bro #116 Standard Nylon Hinges | rudder, elevator, and flaperons hinging |
| 1 | Sullivan #S575- Semi-Flexible Gold-N-Rod | rudder and elevator control rods |
| 2 | Du-Bro #237 T-style Nylon Control Horns (2 each) | control surfaces rigging |
| 2 | Du-Bro #600 2-56 Spring Steel Kwik-Link Clevises | control surfaces rigging |
| 2 | Du-Bro #855 E/Z Links | flaperon rigging |
| 2 | 6" 2-56 control rods | flaperon rigging |
| 6 | 2-56 nuts | rudder, elevator, and flaperons rigging |
| 8 | #1 x 3/8" pan head screws | flaperon servo hatch covers |
| 1 bottle | Titebond Ultimate III wood glue | |
| 1 set | 15-minute epoxy | |

Building the Modified Top Wing

So, with all that said, let us get started with our Stagger Bee scratch build. The first thing I do with all my builds is to print out the plans on my Canon printer using the "poster" settings for a full-size plan. Then I take all those pages and put them together to get all four full-size plan sheets for the Stagger Bee. You may also have your plans printed out at any Staples Store, which will run you approximately \$30.

Builders Notes – 1) The Stagger Bee plans contain templates for all the various pieces that will need to be cut out, so you may want to crop those areas using your favorite .pdf editor, and then use a thicker stock paper when printing versus standard printer paper. 2) As I had indicated earlier, I want to extend the wingspan of the top wing with the addition of an extra 4" rib spacing on each side of the center line. To do this on the plans, I print out that area from the original plans and position them into the top wing plan sheet when putting all the plan sheets together. 3) I also want to add flaperons to the top wing and use a bolt-on mount versus the rubber bands, so I draw in the required changes to the wing structure directly on the modified top wing plan sheet. You can see these changes in Figure 1.

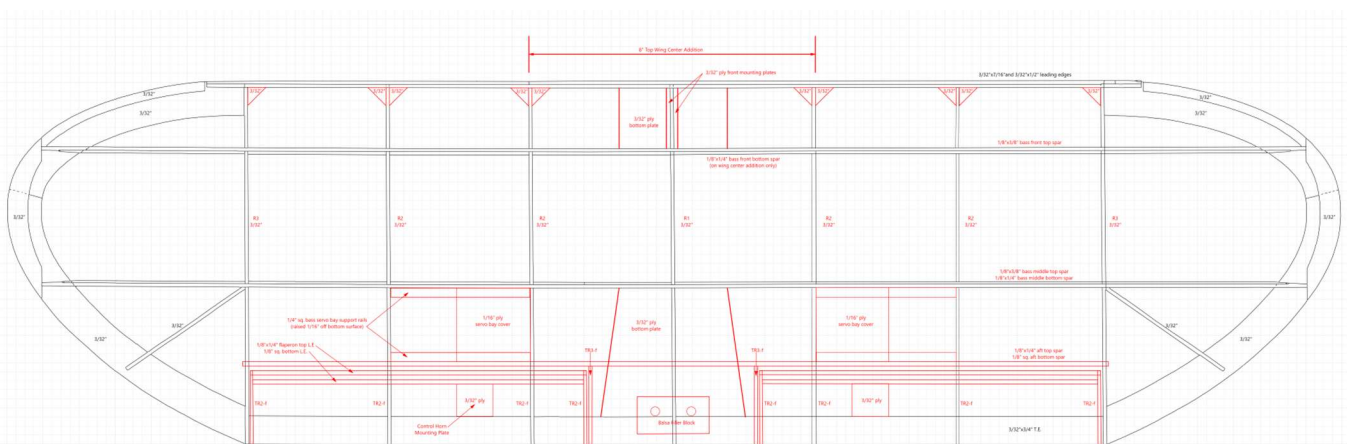


Figure 1 – Extended Top Wing Plan with Bolt-On Mount and Flaperon Modifications in Red

Builders Notes – Modifications required to build a bolt-on top wing and incorporate flaperons includes: 1) Add 3/32" birch plywood to the aft bottom center of wing from the center spar back to the trailing edge, and from the front spar forward to the leading edge; 2) Add a balsa filler to the area around where the two 13/64" holes will be drilled for the 10-32 nylon wing mounting bolts pass-thru; 3) Fabricate seven new top wing ribs per the drawings in Figure 2; 4) Add all the new top and bottom spars per the sizes called out on the rib profiles; 5) Add the new flaperon top and bottom leading edges, and fabricate the two flaperons; 6) Cut the nose piece off fuselage part #3-10, eliminate notches in part #'s 3-1 and 3-3, omit part #3-5; 7) Make fuselage part #2-4 from 1/4" birch plywood and cut the center slot 5/16" wide so it can accept the new wing front hold-down mounting plates; 8) Widen the notches in fuselage part #'s 1-4 and 1-3 to fit the wider part #2-4; 9) Fabricate two wing front hold-down mounting plates from 3/32" birch plywood and epoxy to each side at the front of centerline rib TR1; 10) Fabricate the fuselage aft wing mounting block from 3/8" birch plywood and install below fuselage part #5-2, drill and tap two holes for the 10-32 nylon wing mounting bolts, omit notch in #5-1; 11) Add the two flaperon servo bays per the modified plan.

I will run through the modifications needed for a bolt-on bottom wing and bolt-on wheel pylons when we get to that stage of the build.

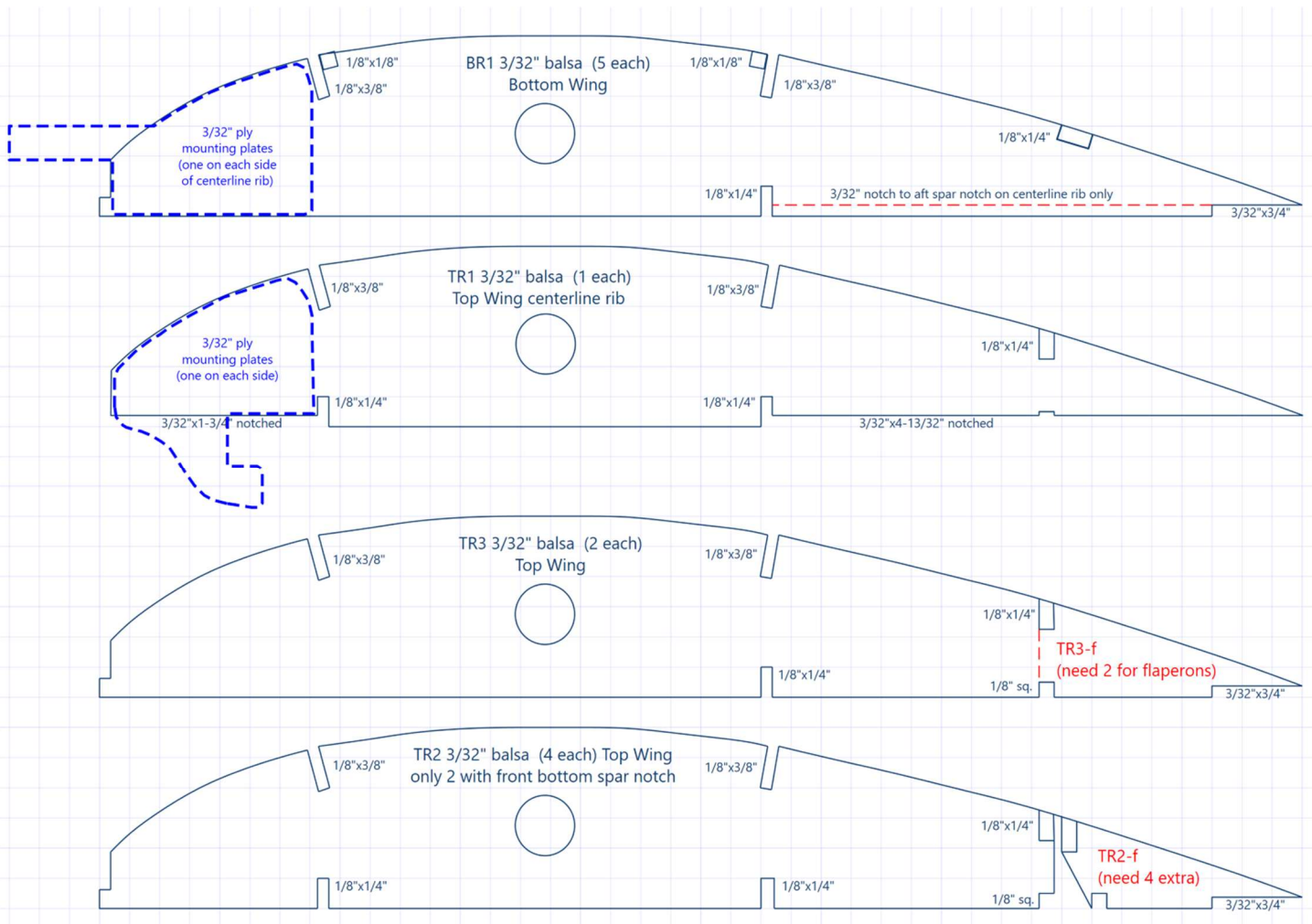


Figure 2 - Modified Wing Ribs

Now the real fun begins. For this scratch build I'm going to use my magnetic building board and mag fixtures, so I put the modified top wing plan sheet on the mag board and cover it with transparent plastic film to prevent the glue from sticking to the plan. Using the plan templates, cut out the various wingtip pieces from 3/32" balsa sheet and place them flat over the plan to check for proper fitting. Once everything fits, place each wingtip piece over the plan (Figure 3) and start gluing them together using Titebond III Ultimate wood glue. You will find it much easier to glue parts if you put the Titebond III in a plastic syringe with a large diameter needle, versus trying to place the glue straight from a large glue bottle. You can find them on Amazon.

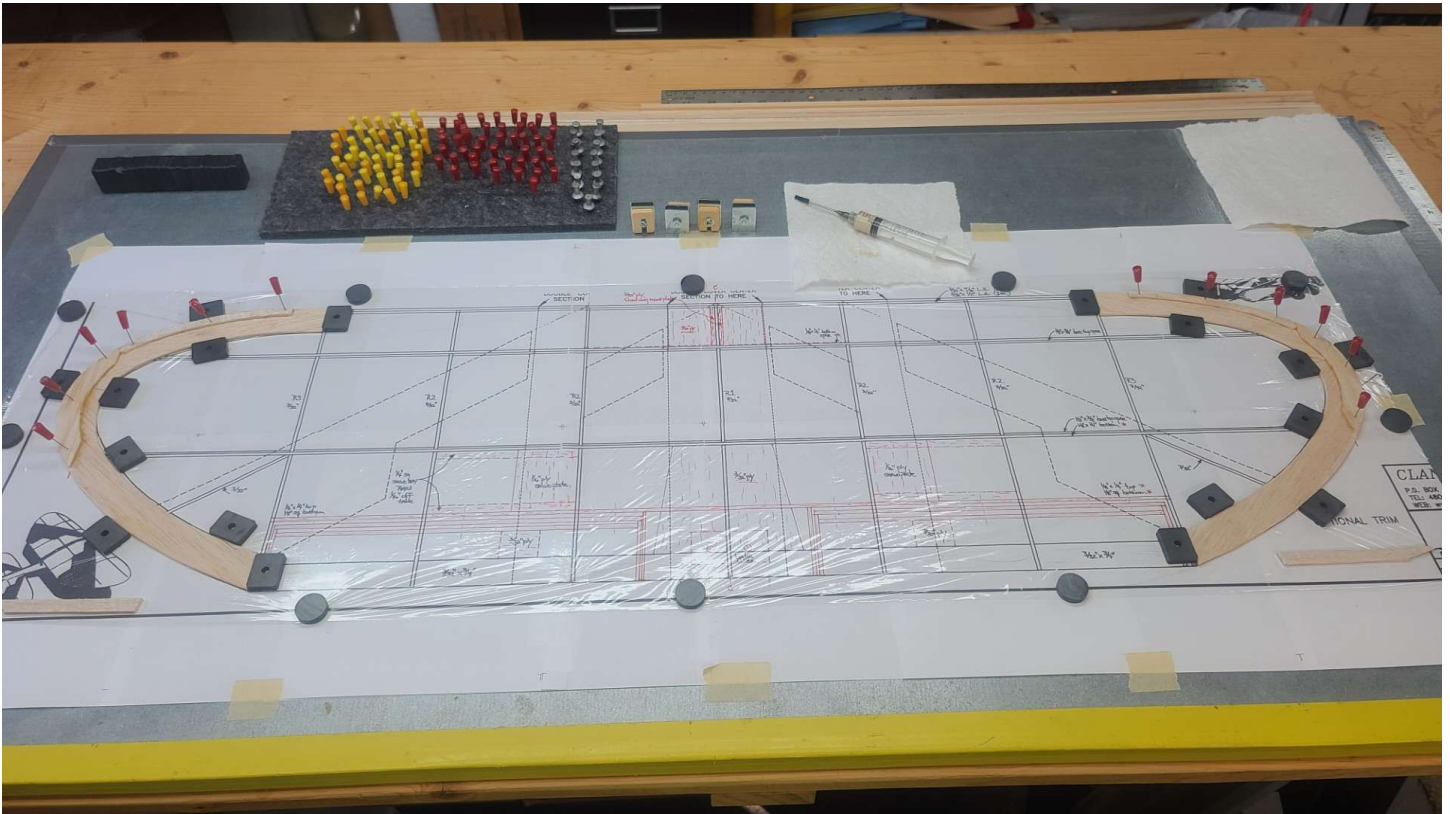


Figure 3 - Modified Top Wing Wingtips Build

I am not going to duplicate all the build instructions contained in the Andy Clancy Stagger Bee plans and manual referenced earlier, but I will try to point out things that need attention and other recommendations based on what I find during my scratch build. Ok, now cut out all the wing ribs and other parts needed for the top wing assembly, paying attention to the directions of the balsa grain shown on the plan for each part. You can see my modified top wing ribs in Figure 4 below.

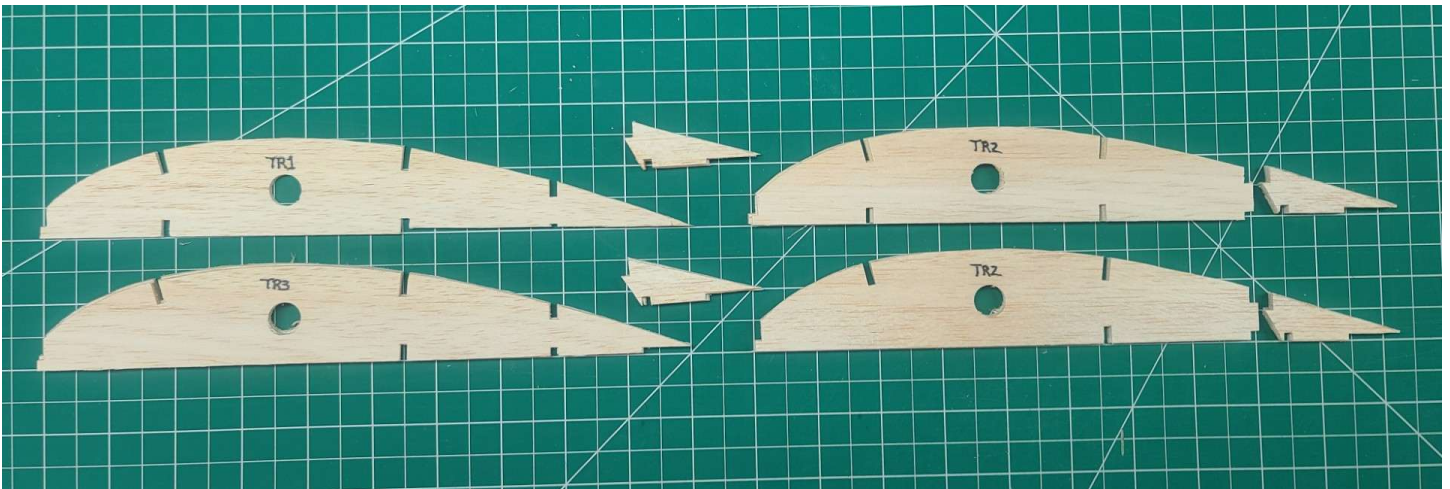


Figure 4 – Top Wing Ribs and Flaperon Parts

Builders Note – Due to the increased wingspan of my top wing, I substituted 1/8" x 3/8" basswood for the two top main spars versus the 3/32" balsa called out on the plan. I also used 1/8" square basswood for the front bottom spar.

Figure 5 shows the modified top wing in a full-up dry fit check. **Here is the real beauty of a magnetic building board.** You can take most, if not all, of the parts for an assembly, and verify how they all fit together **before** you glue anything. In this fit check I found a modification needed on the centerline rib TR1, and that I also needed two more partial TR3 ribs for the flaperon bays. These changes are now captured in the modified ribs drawing (Figure 2). This is the part of a scratch build that I really enjoy. Seeing how the 2-D drawing of a modified plan comes together for a functional 3-D balsa model aircraft. Note the two front hold-down

mounting plates made from 3/32" birch plywood laying on the building board in front of the wing leading edge. **These will be epoxied to each side of the centerline rib TR1 after the fuselage is built.**



Figure 5 – Modified Top Wing Full-Up Dry Fit Check on Magnetic Build Board

With the fit check done we can now complete the assembly of the top wing using Titebond III Ultimate wood glue.

Builders Notes – 1) Remember to cut the slots in the forward centerline 3/32" plywood bottom plate for the two front hold-down mounting plates to pass through; 2) Add the balsa filler to the area around where the two 13/64" holes will be drilled for the two 10-32 nylon wing mounting bolts pass thru; 3) Also remember to raise the 1/4" square basswood rails in the two flaperon servo bays 1/16" off the building board surface so that the servo bay hatches will be flush with the wing bottom surface.

Now make four cuts in the 3/32" x 3/4" balsa trailing edge to form the trailing edges for the two flaperons. Remove the top wing from the mag building board and then finish the assembly of the two flaperons. Lightly sand everything and shape the wingtips/leading edge. Temporarily install the flaperon Du-Bro #116 Standard Nylon Hinges (you may want to add balsa hinge blocks depending on the type of hinge you use), fabricate the two flaperon servo bay covers, and install a Hitch HS-81 16.6g Nylon Gear Analog Micro Servo on each. Your modified top wing should now look something like Figure 6. The modified top wing can be set aside until we get into the fuselage build.

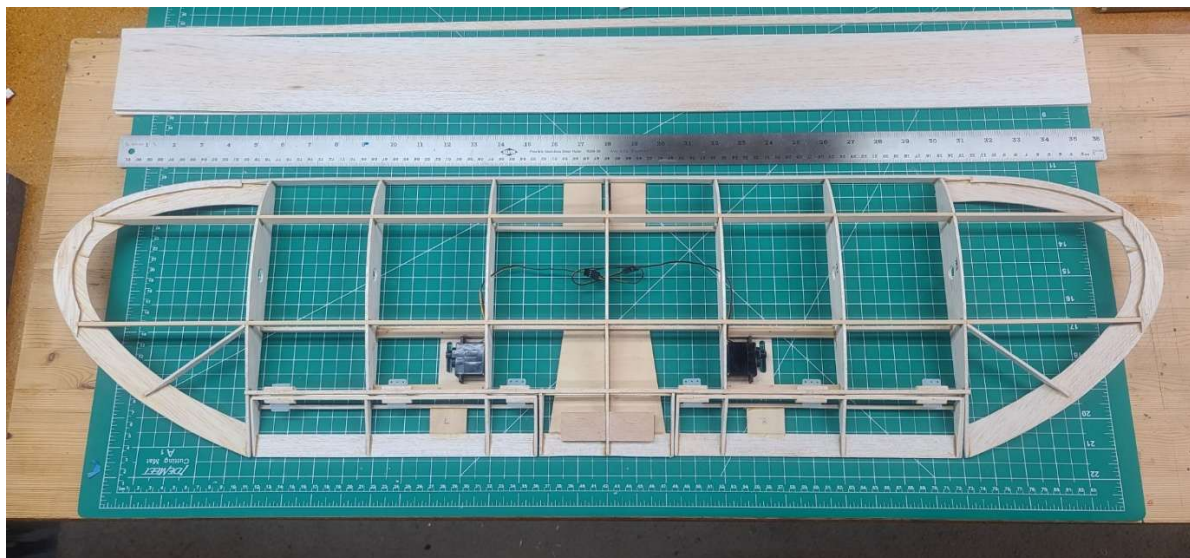


Figure 6 - Modified Top Wing

Building the Modified Wheel Skirts

Before I dive into the modifications of the bottom wing, I need to fully understand how the wheel skirts will be modified so they can be mounted to the bottom wing with wood screws or hex head bolts, versus the rubber bands shown in the plan. I also need their final size to establish the related modifications to the bottom wing, therefore I'm going to build the wheel skirts first. So, let's get started.

Builders Notes – Looking over the various wheel skirt template pieces, the things I see that will require modification are: 1) Replace four 1/32" birch plywood forward mounting plates parts #13-3 with two 3/32" birch ply parts; 2) Addition of two new 3/32" birch plywood aft mounting plates; 3) Add an aft notch cut into the top of the four 1/16" balsa parts #12-1 that will fit the new aft mounting plate; 4) Move the top notch at the front of these four parts aft approximately 3/4" so that parts #13-3 will be even with the front of the wheel skirts; Trim 3/32" off the tops of parts #12-2 and 12-3 for front mounting plate.

Using the templates plan sheet, cut out the various **balsa** wheel skirt parts paying special attention to the grain directions. Fabricate two modified forward mounting plates parts #13-3 and two new aft mounting plates **using 3/32" birch plywood** for all parts. The forward plates should be 1"x2.75", and the aft plates 1"x2.25", all with rounded corners. Now cut the required notches in parts #12-1 to accept the new mounting plates. **Note** – The axle hole location on the plan for part #12-1 is not in the correct location. Use part #12-3 as a template to establish the correct hole position. The aft mounting plate notch should be just aft of the existing notch for part #13-1. When finished you should have the parts shown in Figure 7 below.



Figure 7 - Wheel Skirts Parts

Assemble the wheel skirts per the Stagger Bee Manual. To add some strength to the skirt mounts, I would recommend adding small balsa triangle pieces (see Figure 7) where the mounting plates connect to inside of each part #12-1 and epoxy the four 3/32" birch ply mounting plates to the wheel skirts. Make the MLG axles using 1/8" or 5/32" music wire and Du-Bro #140 5/32" Wheel Collars, and install the MLG wheels per the manual. Use spacers as needed to center the wheels in the skirts. The skirts should now look like those in Figure 8.

Building the Modified Bottom Wing

How about some modifications to the bottom wing plan for a bolt-on wing and bolt-on wheel skirts. Using a similar approach as used on the top wing, I modified the bottom wing plan to incorporate the changes needed. You can see these changes below in Figure 9.

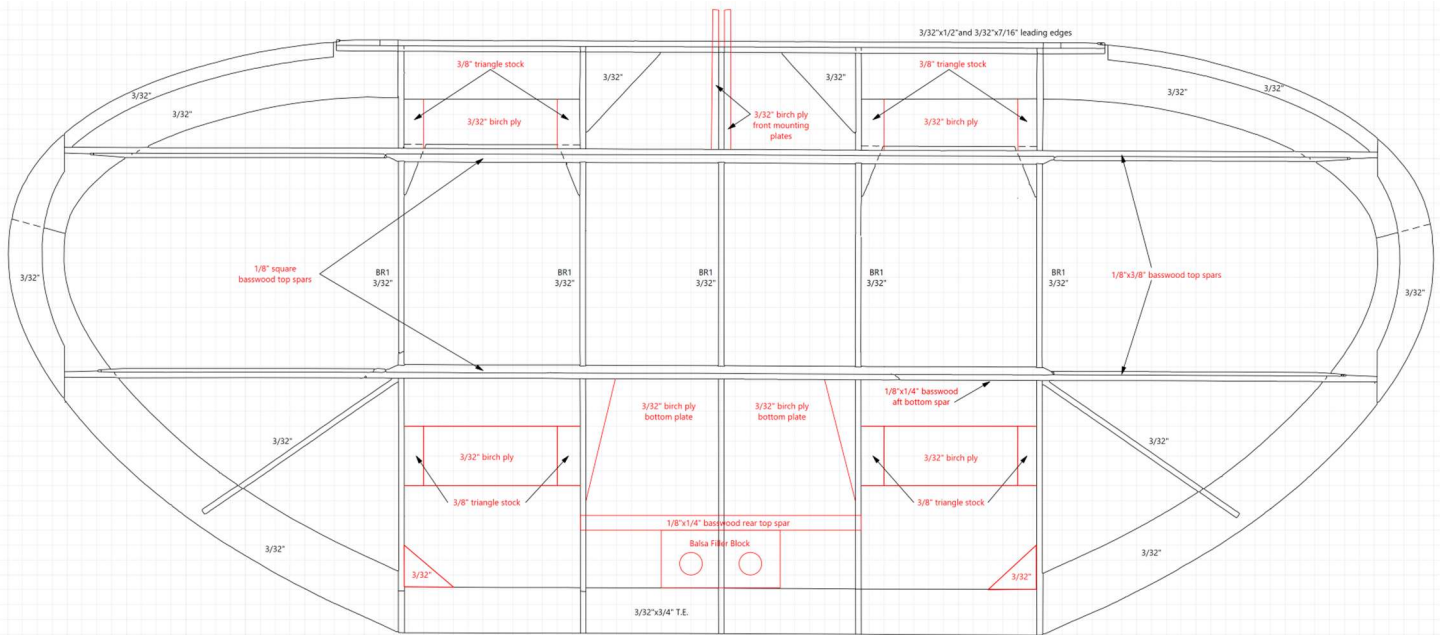
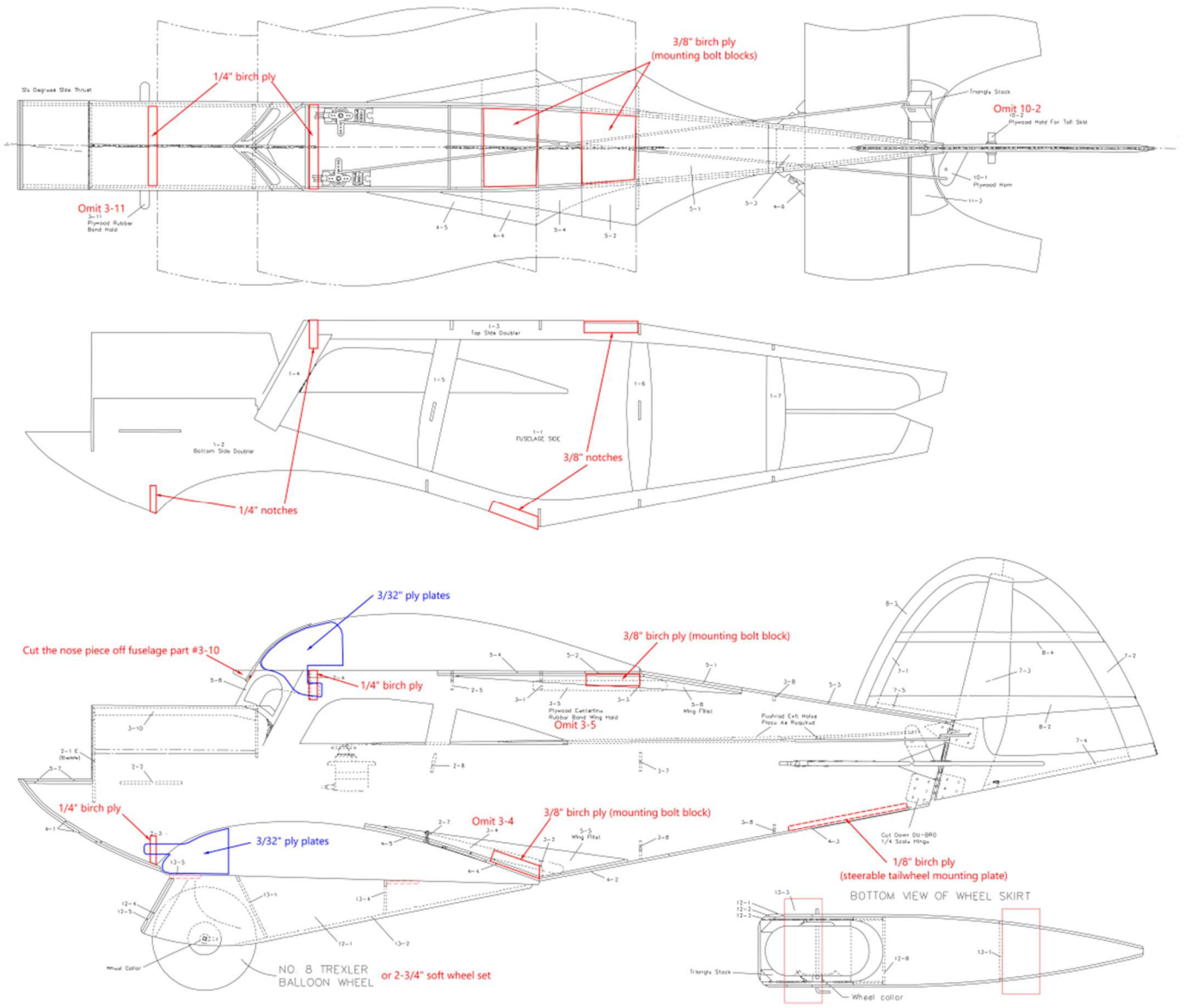


Figure 9 - Modified Bottom Wing Plan

Builders Notes – Modifications required to build a bolt-on bottom wing and incorporate bolt-on wheel skirts includes: 1) Add a 3/32" birch plywood plate to the aft bottom center of wing from the bottom center spar back to the trailing edge; 2) Fabricate five new bottom wing ribs per the drawing in Figure 2; 3) Add all the new top and bottom spars per the sizes and the materials called out on the modified bottom wing plan; 4) Add the four new 3/32" birch plywood wheel skirt mounting plates as shown in the plan and add 3/8" triangle stock to each corner with ribs BR1; 5) Add a balsa filler to the area around where the two 13/64" holes will be drilled for the 10-32 nylon wing mounting bolts pass-thru; 6) Eliminate notches in part #'s 2-7 and 3-2, omit part #3-4 and #3-11; 7) Make fuselage part #2-3 from 1/4" birch plywood and cut the center slot 5/16" wide so it can accept the new bottom wing front mounting plates; 8) Widen the notch in fuselage part #1-2 to fit the wider part #2-3; 9) Fabricate two bottom wing front mounting plates from 3/32" birch plywood and epoxy to each side at the front of centerline rib BR1; 10) Fabricate the fuselage aft bottom wing mounting block from 3/8" birch plywood and install forward of fuselage part #3-2, drill and tap two holes for the 10-32 nylon wing mounting bolts, omit notch in fuselage part #4-2.

The bottom wing is built on my magnetic building board using the same steps as were used for the top wing. Lightly sand everything and shape the wingtips/leading edge. Your modified bottom wing should now look like the wing in Figure 10. Note the two front mounting plates made from 3/32" birch plywood laying on the building board in front of the wing leading edge. **These will be epoxied to each side of the centerline rib BR1 after the fuselage is built.** The bottom wing can be set aside until we get into the fuselage build.



Don't forget, all the images in this build description are available for you to view in greater detail and larger size on my website @: https://balsaandglass.com/Balsa_Photos.html#Stagger.