SWAYBACK 200 by Bob Aberle

Chet Lanso's SWAYBACK as a reduced size Old Timer free-flight replica with electric power and RC assist.

Scaled down to 200 sq.in with a flying weight of 9.1 ounces.

BACKGROUND

Once again my choice for an aircraft design came from our own RCMW. In our January 2015 issue (page 17), I read about a little known Chet Lanzo free flight design that was published in a 1947 issue of Air Trails magazine. It was called the SWAYBACK.

Here I am holding my reduced size version of the SWAYBACK to give you an idea of the small size. This is clearly in the small park flyer category.

I did a little researching of this model for this article. First of all Chet Lanzo was a well known free-flight modeler who lived in the Cleveland, Ohio area. A close friend of Chet's was the late Joe Elgin, who designed the famous PLAYBOY series of free flight models.

What caught my attention on the SWAYBACK is that it had exactly a PLAYBOY SR wing and tail. But obviously Chet wanted to do something different and the result was this odd shaped (SWAYBACK) fuselage configuration. You can see that in the next photo.

I've had a thing for the PLAYBOY free-flight series. I was also very proud to be a personal friend of Joe Elgin's, having met him many times at local SAM competitions.

More than that, I built and flew a PLAYBOY SR at 600 square inches and was able to win my first and only AMA NATS First place in Class-B Old Timer at the 1996 AMA National in Muncie.

This photo shows the new SWAYBACK in the lower left foreground. In back and to the left is my PLAYBOY-SR-600 and to the right is my PLAYBOY-425 that I eventually published in the June 2000 issue of RC MODELER magazine.

Here I am posing behind all three models for a size comparison.

My PLAYBOY-SR-600 with my AMA NATS first place trophy in the foreground.

ABOUT MY -SWAYBACK-200 DESIGN

The original SWAYBACK was probably more like 800 square inches of wing area. Most of my reduced size old timers appearing in RCMW run about 200 square inches.

That produces a plane with about a 40 inch wing span. Of course it would be electric powered and would have RC control of the flight surfaces. I kept the undercambered airfoil. It is much easier to do than you think and adds to the flight performance.

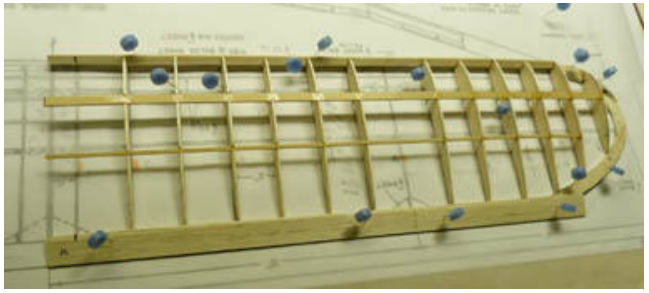
I added a little more vertical fin area, since my experience has shown that as the plane size is reduced, you need more area. I also extended the nose somewhat to aid in balancing the aircraft.

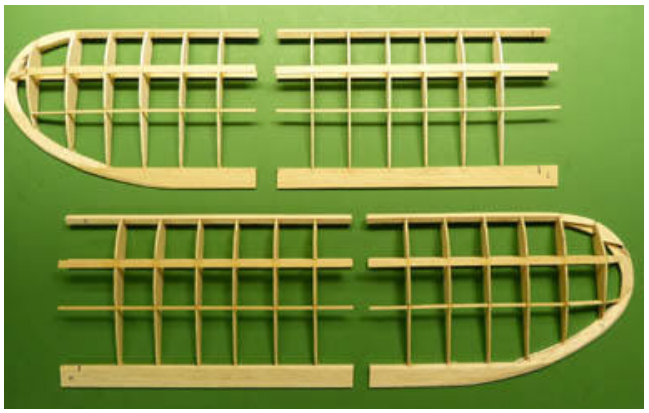
Finally I substituted 1/16 balsa sheeting for the tail surfaces. Keep in mind that in doing this, the CG location had to be moved forward somewhat. That's why I extended the nose length. The total weight of 9.1 ounces made for a very light wing loading and the ability to get away with under 40 watts input electric power.

CONTRUCTION NOTES

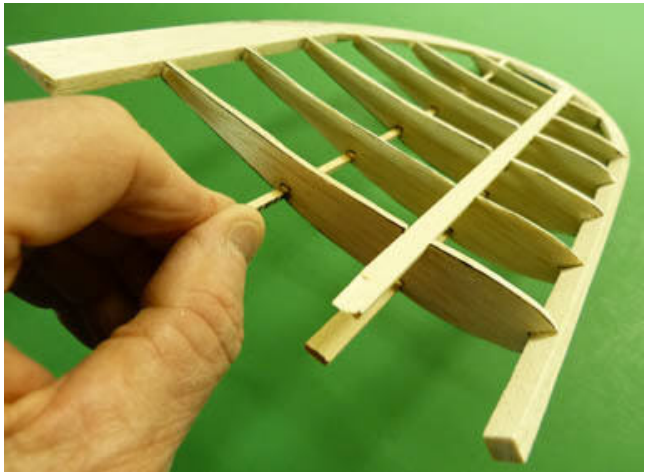
I generally strip all of my sticks from sheet balsa stock. This way I obtain the proper sizes without having to visit several hobby shops. It looks like a lot of ribs, but it is really easy to cut them out. Note that I used spruce for the 1/16 X 1/4 main spars.

The two top wing spars are installed first. Then after the panels are removed from the building board, the bottom main spar is added. Even though the wing has an undercamber, the trailing edge sits flat on your building board.

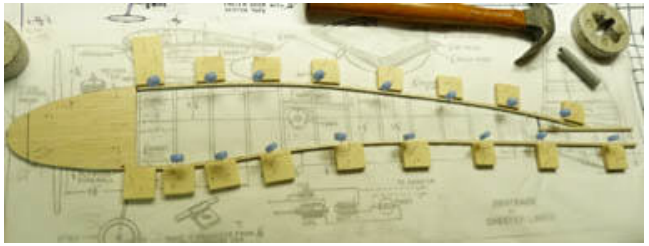




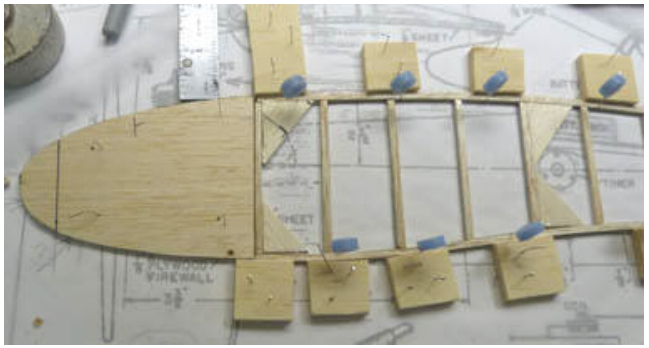
In this next photo you clearly see the undercambered lower wing surface. When covering the bottom of the wing make sure you apply heat so that the covering material sticks to the bottom of each rib.



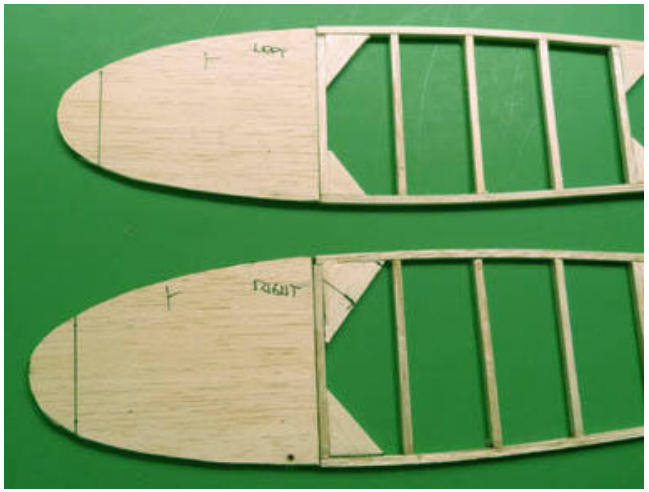
Three dihedral braces are required. Each is made from 1/32 plywood.

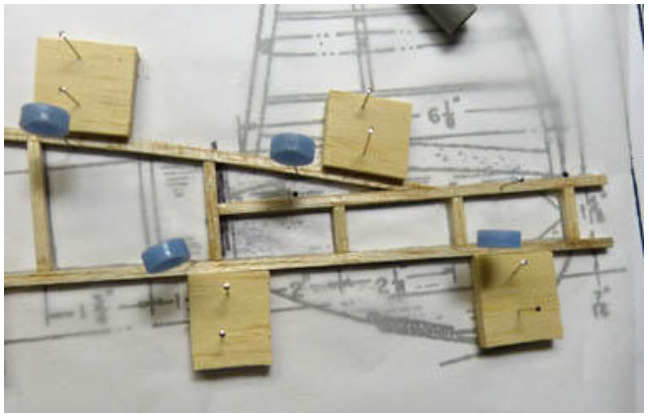


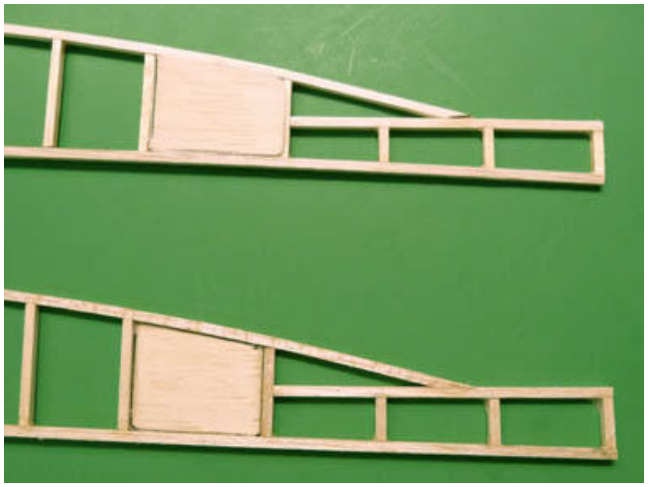
The fuselage is fashioned basically from 1/8 square medium grade balsa. Scrap pieces of balsa wood is used to form a jig. Both fuselage sides are made individually. The jig assures that both sides turn out identical in shape.



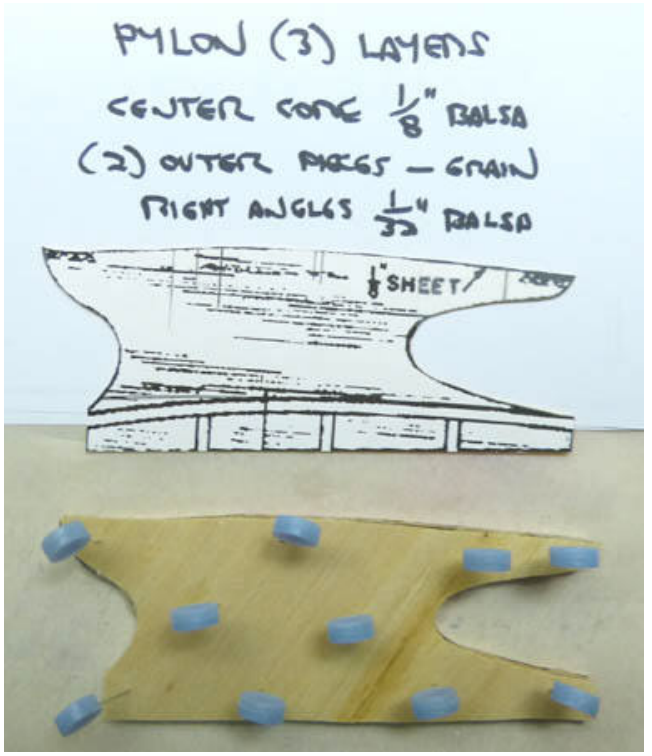
Because of the unusual fuselage shape of the SWAYBACK, you must be very careful. The 1/8 balsa gussets are essential to maintaining the fuselage shape. The front of the fuselage is made from 1/8 balsa sheet. Note that several areas have 1/16 balsa fill.



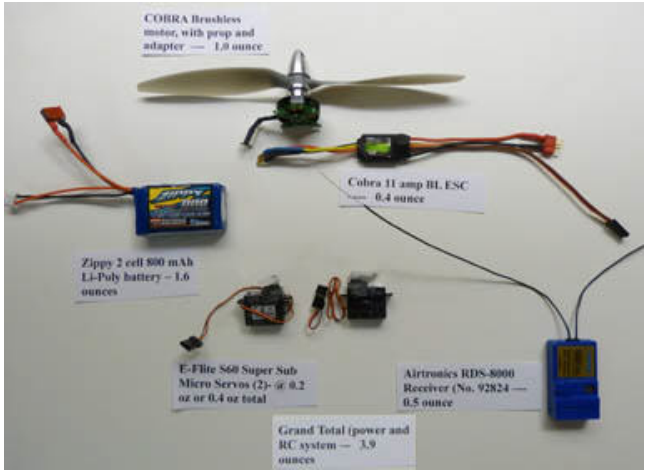




The wing pylon is constructed from three pieces of balsa. The center core piece is 1/8 inch hard balsa. Then two outer pieces of 1/32 inch balsa goes on either side of the core. Have the gain go 90 degrees from each other.



Now would be a good time to introduce you to the power and RC system I used on the SWAYBACK. The next photo shows all the components.

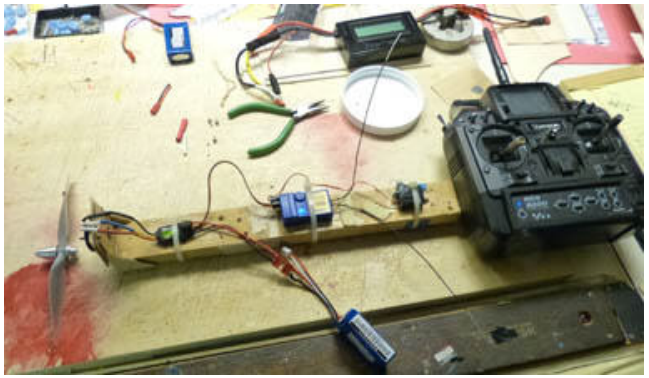


I found a new source for reasonable brushless outrunner motors and ESC's from a California company known as Innov8tive Design. I found their motors to be good quality and the documentation that goes with each motor is incredible.

There is a chart with a variety of prop sizes and the resulting motor current and power input figures. Try this website and see what I mean:

http://innov8tivedesigns.com/c-2202-70

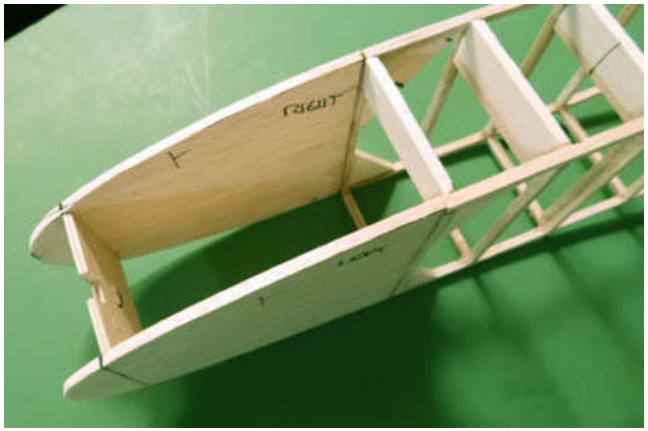
This motor sells for $17.99. They also sell a companion brushless ESC rated at 11 amps for $15.99.

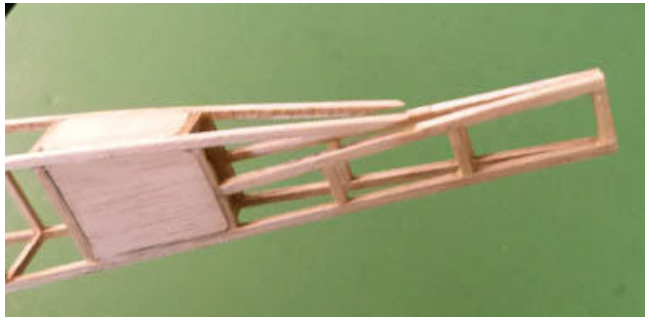


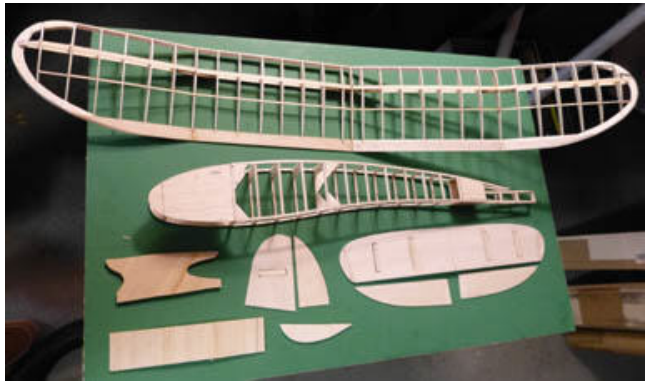
This is my test set up for measuring motor current and power input. You will also notice that I'm now using Airtronics RC equipment.

The next photo is a close up of the Cobra 2201/70 motor mounted to the firewall.

Now the fuselage begins to take shape with the cross pieces being added.

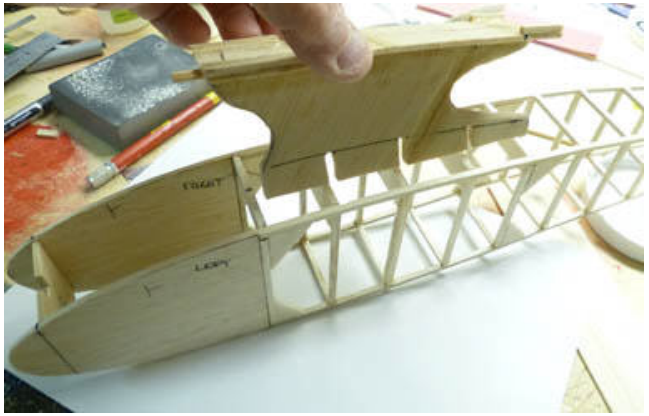


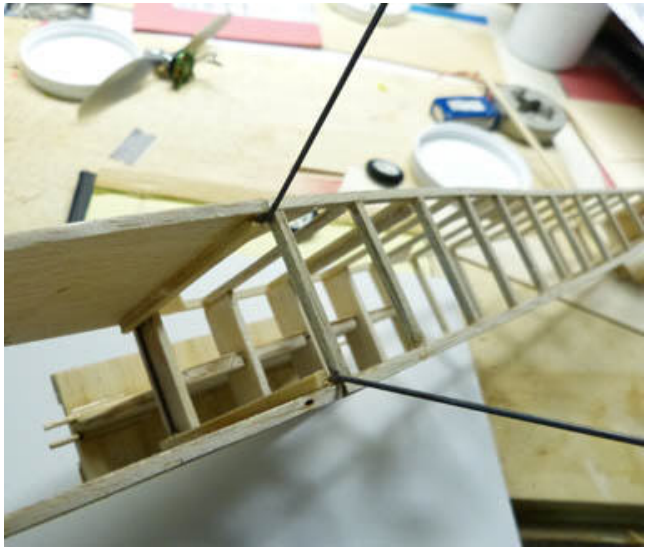




Most of the built-up parts prior to final assembly.

Installing the wing pylon mount is next.

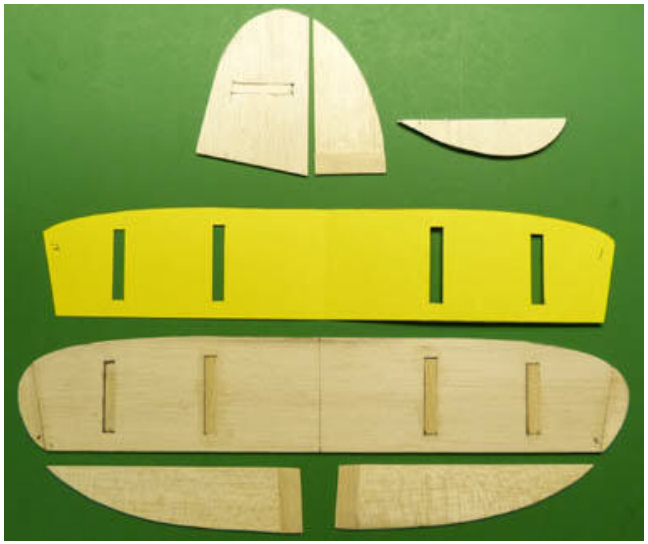




The landing gear wire is installed next using 5 minute epoxy cement, followed by a view of the assembly moving along

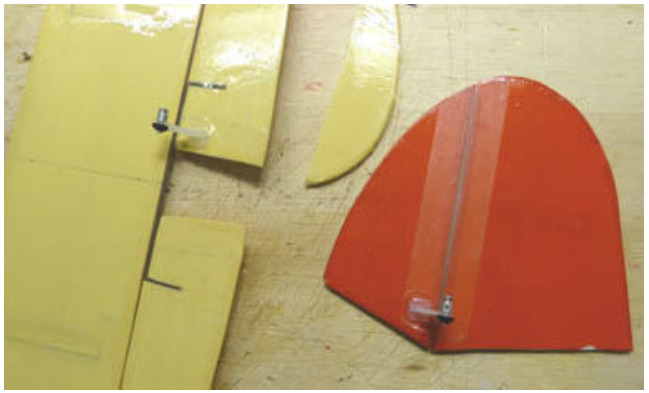
Here are two views of the lower forward battery compartment taking shape.

The next photo shows the the receiver sliding into place.



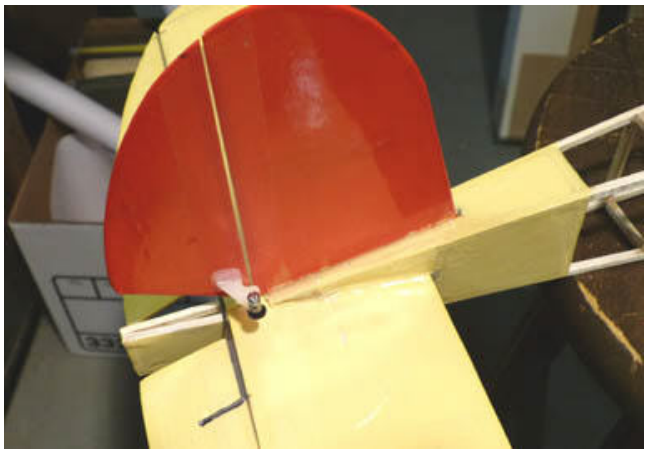
The tail pieces are all cut from medium 1/16 balsa sheeting. Note that cross grain stiffener strips are added to brace both the stab and fin. Templates were cut from manila file folders.

The two elevators were joined with .047 inch diameter wire.



DuBro Electric Flyer Hinge tape was used on the elevator and rudder.

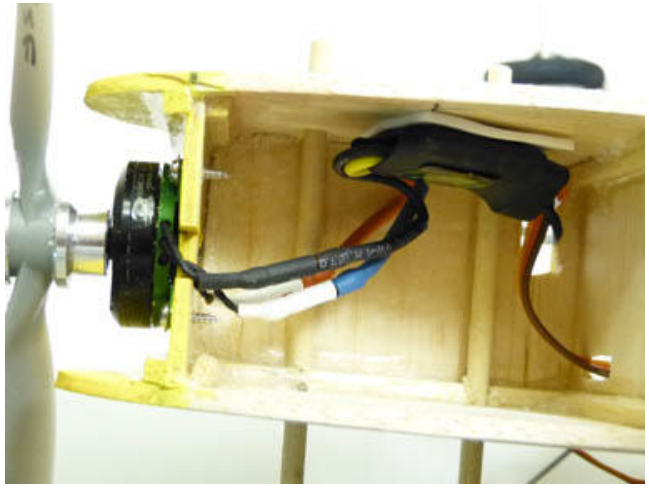
This next item is important. I pre-cover the rear end of the fuselage. In this case I used Solite available from BP Hobbies. This allows me to install the control rod tubes before the entire fuselage is covered which eliminates a lot of tedious work.



The stab and vertical fin is then installed. Use 5 minute epoxy cement. DuBro Micro control horns (#919) are used on the elevators and rudder. The wire rods are connected to the horns with DuBro Mini Easy Connectors.

The two E-Flite S-60 micro servos are attached to the 1/16 balsa fill pieces on either inside of the fuselage. Use 3M double mounting tape along with some silicone adhesive.

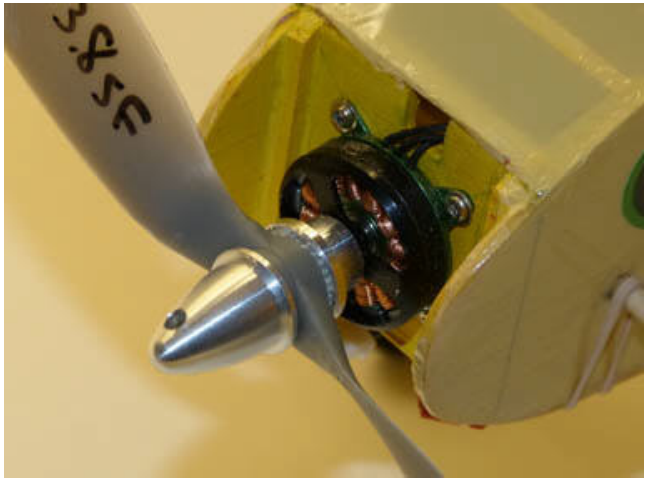
Likewise the 11 amp ESC is attached to the fuselage between the firewall and the receiver bulkhead. Again use mounting tape and adhesive.



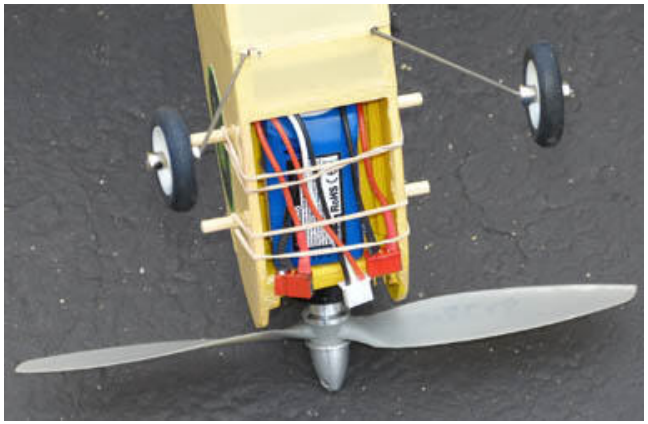
The structure is now ready for the full covering job using the Solite material.

The finished SWAYBACK posing with the Airtronics RDS-8000 transmitter.

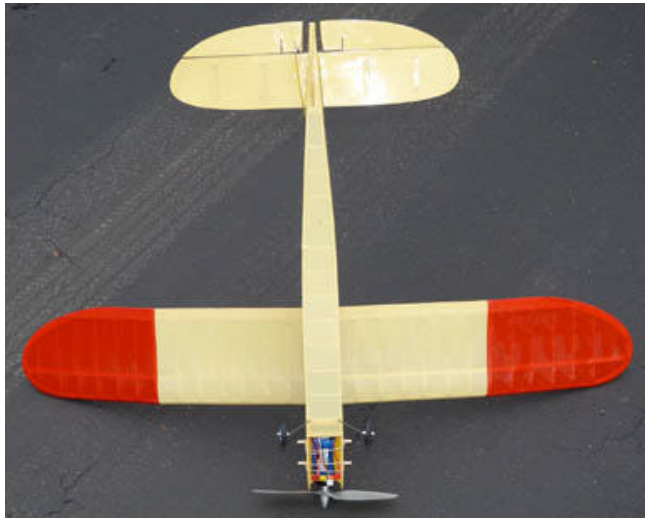
The next photo is a close-up of the Innov8tive Design brushless outrunner motor.



The completed SWAYBACK at 9.1 ounces ready for first flight.



The 2 cell 800 mAh battery is held in place with two small rubber bands.



The underside of the SWAYBACK

Bob holding the SWAYBACK to give you a better idea of the fuselage shape.

FINAL CG and CONTROL THROWS

I set the CG point at 1-5/8 inches back from the wing leading edge. That's at the 29% point. Had I duplicated the original built up stab, with an airfoil shape, the CG could have been moved back somewhat. I think the flat, sheet balsa stab is the easier way to go.

The extended nose length was essential to getting this model to balance properly.

Control throw was 5/8 inch either side of the neutral position for the rudder and 1/2 inch either side for the elevator. You may find that a little much. You can always set up for dual rate control where you have the low rate at 25% less than the full rate. I did not use any expo rate with this aircraft

FLYING

As one of my club members kindly said, "it flies as good as it looks". True, it is a really "cute" aircraft. The choice of the red and cream covering material, (which was Solite from BP Hobbies), certainly enhanced the overall appearance.

On any kind of smooth surface you should have no problem taking off the ground. Hand launching is a snap, it just pops right out of your hand. I haven't done any thermaling yet, because our Long Island weather is still quite cold.

I used the APC 7 X 5E prop running at about 38 watts. The motor can take up to 45 watts. An alternate prop would be an APC 8 X 3.8 SF which will run upwards of 42 watts. The choice is up to you.

I'm getting at least ten minute motor runs on my 2 cell 800 mAh Li-Poly battery. There is easily enough room to go to a 1000 mAh pack, if you wanted more run time. The battery pack is easy to remove for charging or swapping.

Here are a few shots of the SWAYBACK in flight.

SUMMARY

This is my 15th old timer design to appear in RCMW since I started contributing designs back in 2005. As already pointed out, all of these old timer designs were made with 200 square inches of wing area.

That puts these planes in a class by itself. It has always been my hope that someone in the SAM organization would develop a set of rules for a contest event dedicated to this size old timer aircraft. So far no SAM member has taken up the challenge.

By the way, while writing this article, I discovered that recently the SAM organization moved up the cut-off date for old timer models. For many years that cut-off date was limited to models published or kitted prior to December 1942. But within the last year the SAM people have moved that date up to 1950.

So in this case the SWAYBACK fits that new category. It also means that post WW-II free models, like the popular Civy Boy, Sandy Hogan and Humdinger, now also qualify for SAM competitions. Keep that inn mind! Anybody for a Civy Boy?

Bob Aberle
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SPECIFICATIONS

Model: "SWAYBACK-200"

Designed Originally by noted free-flight modeler, Chet Lanzo just after WW-II and ultimately published in a 1947 issue of Air Trails. Reduced in size and redesigned for electric power and RC by Bob Aberle in 2015.

Type: Reduced Size Electric Powered Replica of an old timer free flight model now suitable as a Park Flyer.

Wingspan: 40 inches
Wing Area: 200 square inches
Length: 25 inches
Weight: 9.1 ounces
Wing Loading 6.5 oz/sq.ft.

RC GEAR USED

Airtronics RDS8000 transmitter operating on 2.4 GHz spread spectrum, Airtronics No. 92824 receiver and two Horizon E-Flite S60 super micro servos operating the rudder and elevator.

POWER SYSTEM USED

Innov8tive Designs brushless outrunner motor (Cobra C-2202/70, Kv=1530), APC 7 X 5E prop, Cobra 11 amp brushless ESC and a Hobby King Zippy 2 cell 800 mAh Li-Poly 2 cell 850 mAh Li-Poly battery (1.6 ounces)

POWER SYSTEM PARAMETERS

Prop: APC 7 X 5E
Motor current: 5.01 amps
Voltage: 7.65 volts (under load)
Power Input: 38 watts
Battery Loading: 6.3C
Power Loading: 66.7 watts/pound
Flight Time: 10 minutes but with some motor throttling expect 12 to 14 minutes.

SOURCE REFERENCES

Airtronics - RDS8000 transmitter and companion No. 92824 receiver
http://www.airtronics.net/index.php/radios-receivers/2-4-ghz-aircraft-radios-1.html

BP Hobbies - CA cement, CA accelerator, Solite covering material, 5 minute epoxy cement and APC props
www.bphobbies.com

Callie Graphics - AMA license number decals
admin@callie-graphics.com

DuBro - 1.25 inch (32 mm) diameter Mini-Lite Wheels (#125MW), micro control horns, mini EZ connectors, electric flyer hinge tape and 1/16 inch wheel collars
www.dubro.com

Horizon Hobby - Two E-Flite S60 super micro servos
http://www.horizonhobby.com/

Innov8tive Designs - Brushless motor and ESC
http://innov8tivedesigns.com/c-2202-70

Stevens Aero Models - .073 inch OD Yellow Teflon tubing for the elevator and rudder control rods
http://stevensaero.com/shop/product.php?productid=16639