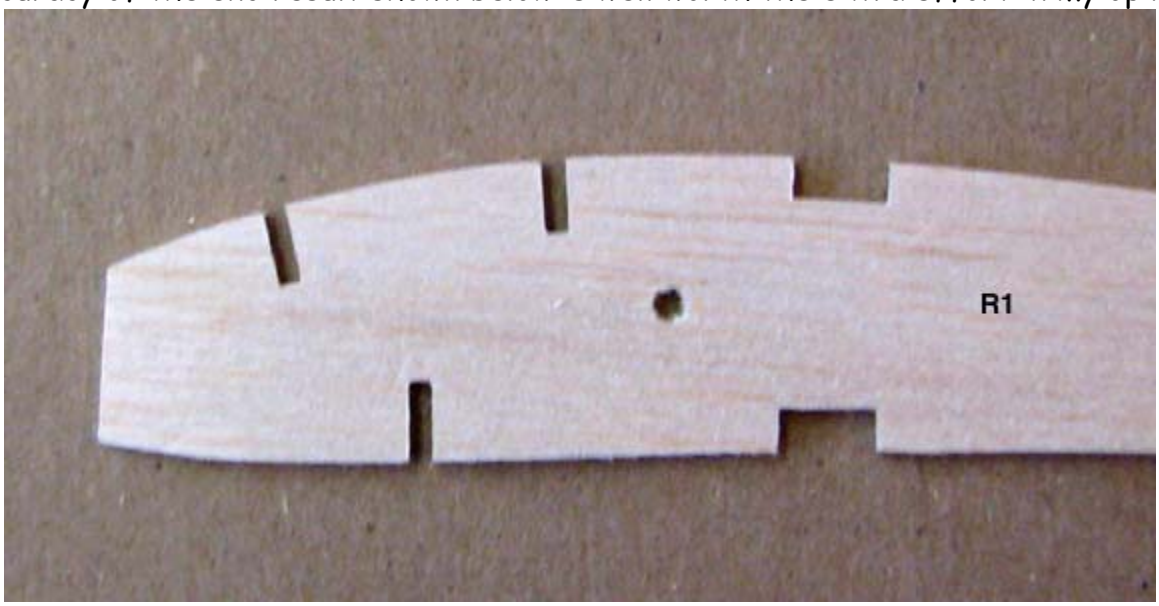
modelers after all and building models is part of what we do and enjoy. So it takes a little extra time, the notch accuracy of the end result shown below is well worth the extra effort in my opinion.



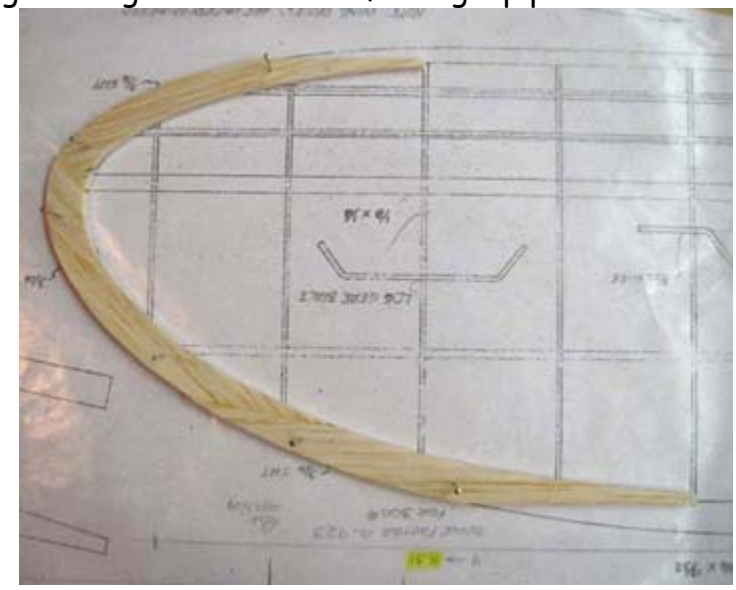
I hope this information will be helpful, especially to the more inexperienced model builders that are having trouble. Of course you must realize that over time all modelers have developed their own way of doing everything. This is only one of many ways to notch ribs and probably not the best way.....Tandy

David Harding

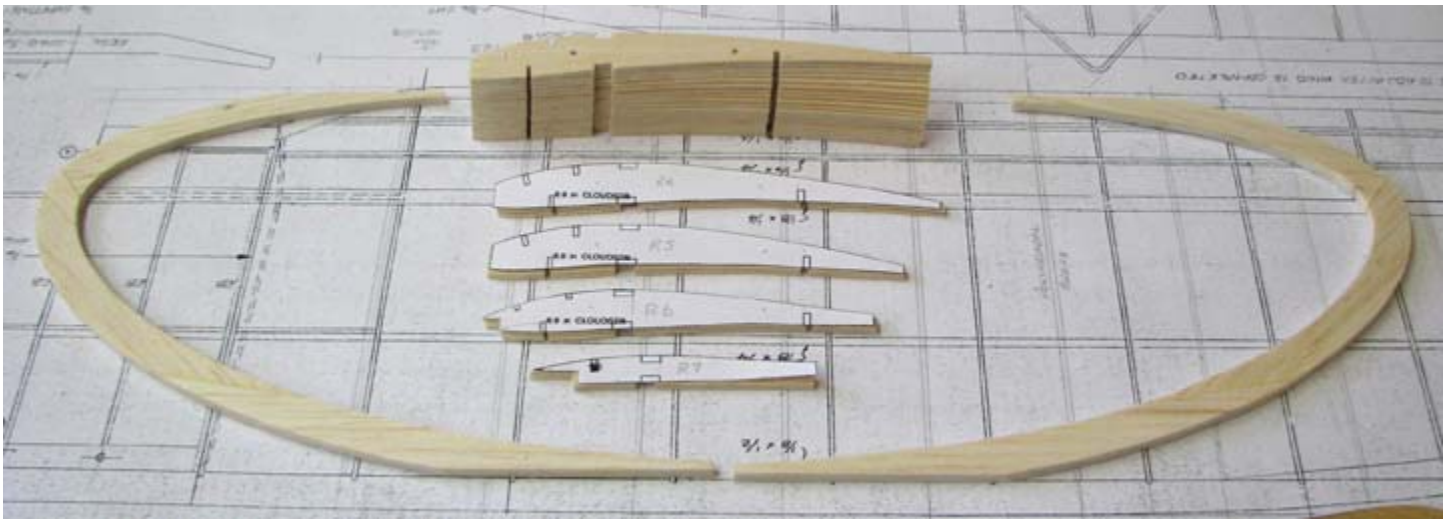
From: Tandy Walker [tandyw@flash.net]
Sent: Monday, December 21, 2009 4:28 PM
To: Undisclosed-Recipient: ;@smtp102.sbc.mail.mud.yahoo.com
Subject: 32 Speed 400 Cloudster - Wing Tips and Ribs

Speed 400 Cloudster Project

The Cloudster plans call for pre-gluing the wing tip pieces together into a unit so that the tip of the unit can be blocked up 1/4" [scaled to (.231")] before gluing it to the leading and trailing edge. In the picture below, the three wing tip pieces are pinned down and glued together on the left wing tip plan as shown below.



The wing's leading edges, trailing edges, and all of the spars have selected. In addition, all of the wing pieces, except the three center section ribs, have been cut out. You can see in the picture below (1) the two 3/16" wing tip units, (2) eighteen of the 1/16" R1 ribs stacked together, and (3) two each of the 1/16" R4, R5, R6, and R7 tip ribs. The center section ribs will be cut out later after the complete right and left wing halves have been built. A review the method of wing attachment will be reviewed carefully before the center section of the wing is built.....Tandy

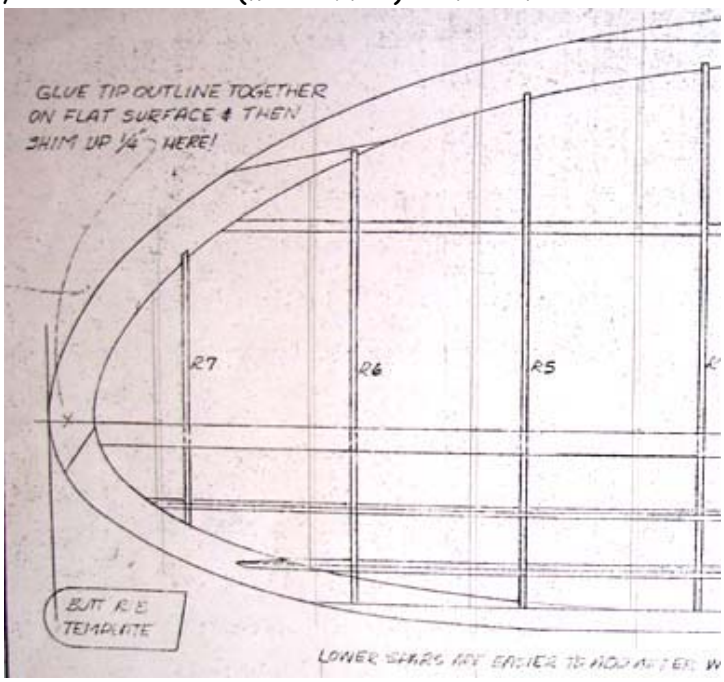


David Harding

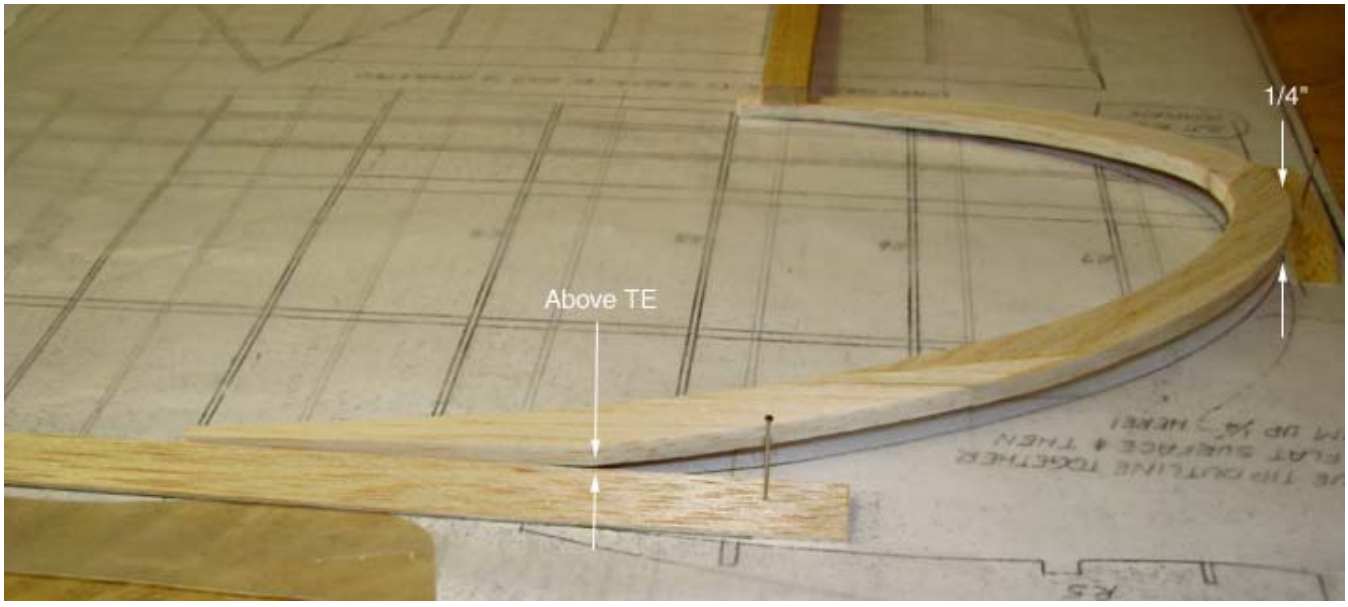
From: Tandy Walker [tandyw@flash.net]
Sent: Tuesday, December 29, 2009 5:01 PM
To: Undisclosed-Recipient: ;@smtp104.sbc.mail.mud.yahoo.com
Subject: 35 Speed 400 Cloudster - Wing Right Tip Panel

Speed 400 Cloudster Project

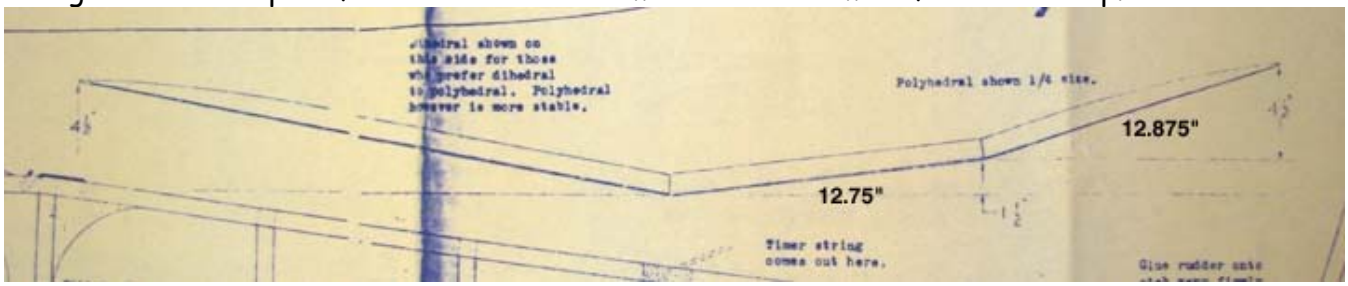
Wing tip panels have always been a challenge. Getting the spars and tip ribs to transition and taper down out at the tip is difficult and mostly an art form. It is always kind of a guess as to how much to curve the top spar down or the bottom spar up out at the wing tip. However as shown below, the Jim Adams plans specify that the wing tip pieces glued together as a unit are to be shimmed up 1/4", which scales to (.923 X .25) = 0.231".



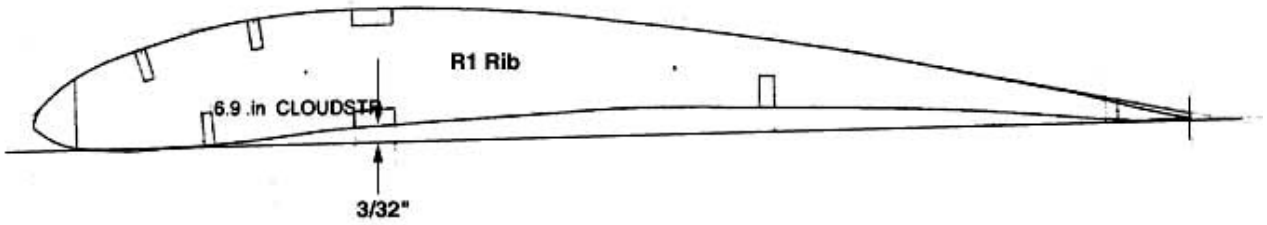
Therefore, it was thought that the tip panel was going to be easy on the Cloudster wing. It turns out that this couldn't have been more wrong as shown below. When the wing tip pieces glued together as a unit are shimmed up, the unit does not mate ***(interface)*** properly with the trailing edge, so the question is what to do?



Referring back to the insert of the front view of polyhedral wing on the Cleveland Cloudster plans below, it can be clearly seen that the bottom surface of the wing tip panel remains straight and the top surface curves down to meet the bottom surface at the tip.

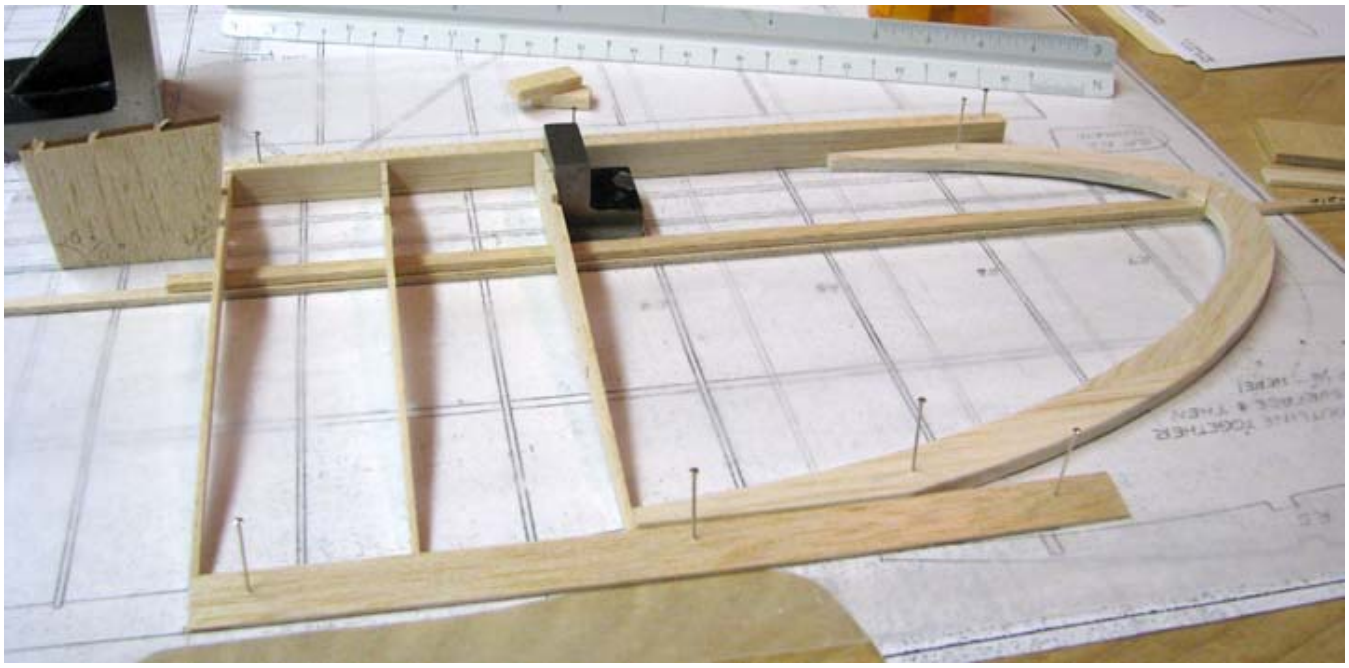


When the leading and trailing edges are pinned down on the plan in an attempt to accomplish this, the wing tip unit can not also be flat on the plan. You see due to the wing's undercamber, the bottom spar is elevated off the plan and will not tie into the tip unit properly. The solution to this problem can be addressed by looking at the R1 rib pattern below. First, the bottom spar is elevated 3/32" off the plan. By shimming the bottom of tip unit up 3/32" off of the plan at the tip, the bottom spar can be straight as well as flush with the tip unit at their intersection and the bottom surface of the wing tip panel will remain straight.



In the picture below, the leading and trailing edges have been pinned down and the first three R1 ribs have been glued in place, with root rib inclined at 96.85 degrees. The wing tip unit has been elevated 3/32" at the tip and glued in place. The 3/32" X 1/4" bottom spar has been

put in place with a 3/32" spacer put underneath such that the bottom spar is flush with the tip unit at their intersection.



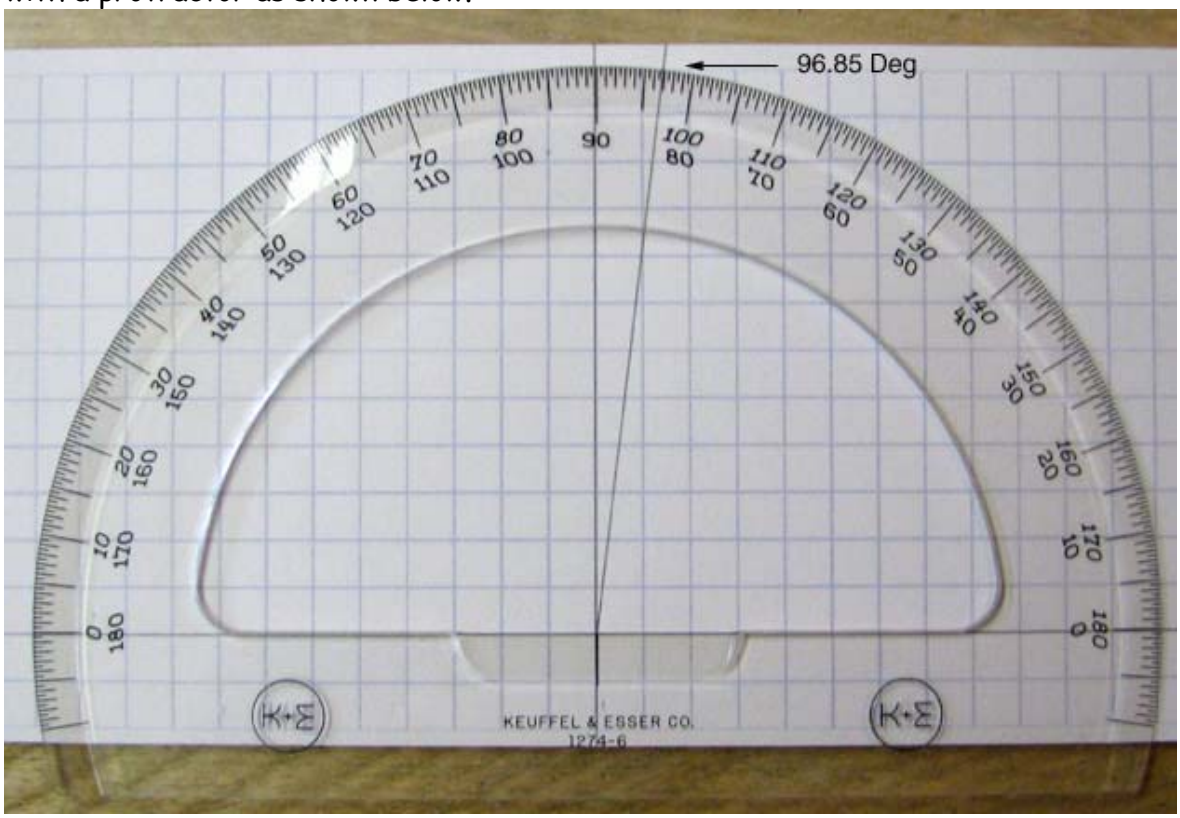
From this point on, the remaining tip ribs will be glued in place and then the top 3/32" X 1/4" will be installed and bent down into place.....Tandy

David Harding

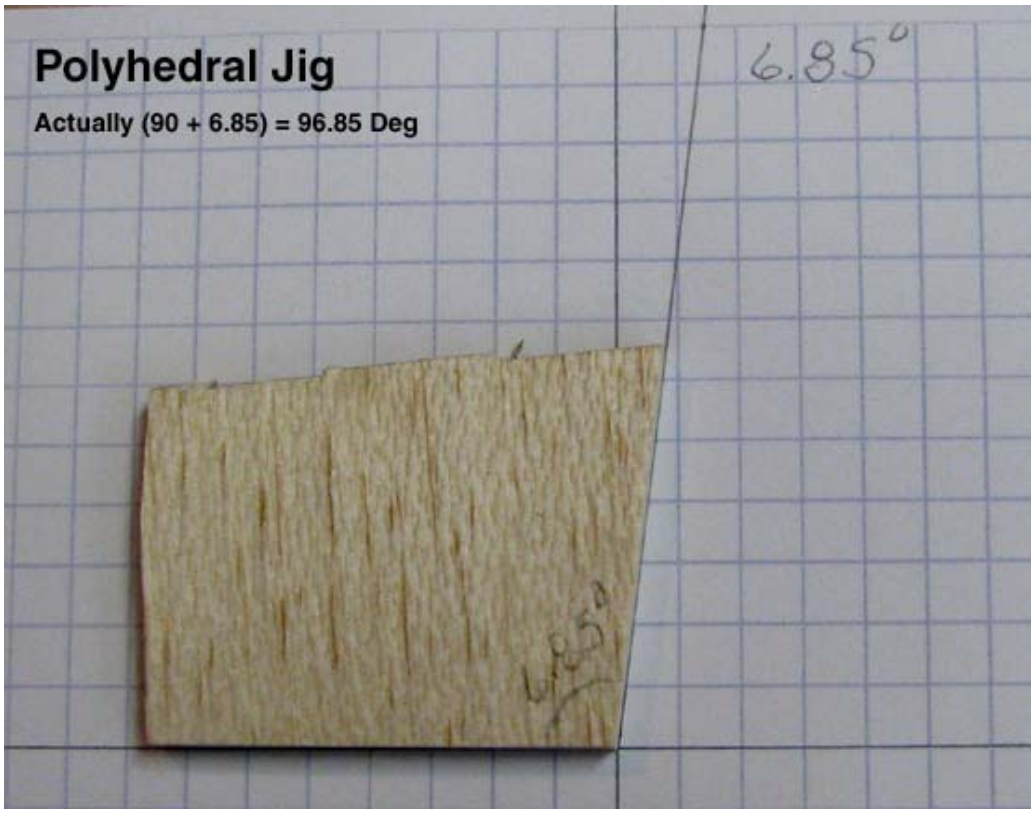
From: Tandy Walker [tandyw@flash.net]
Sent: Thursday, December 24, 2009 12:04 AM
To: Undisclosed-Recipient: ;@smtp108.sbc.mail.mud.yahoo.com
Subject: 34 Speed 400 Cloudster - Wing Right Inner Panel

Speed 400 Cloudster Project

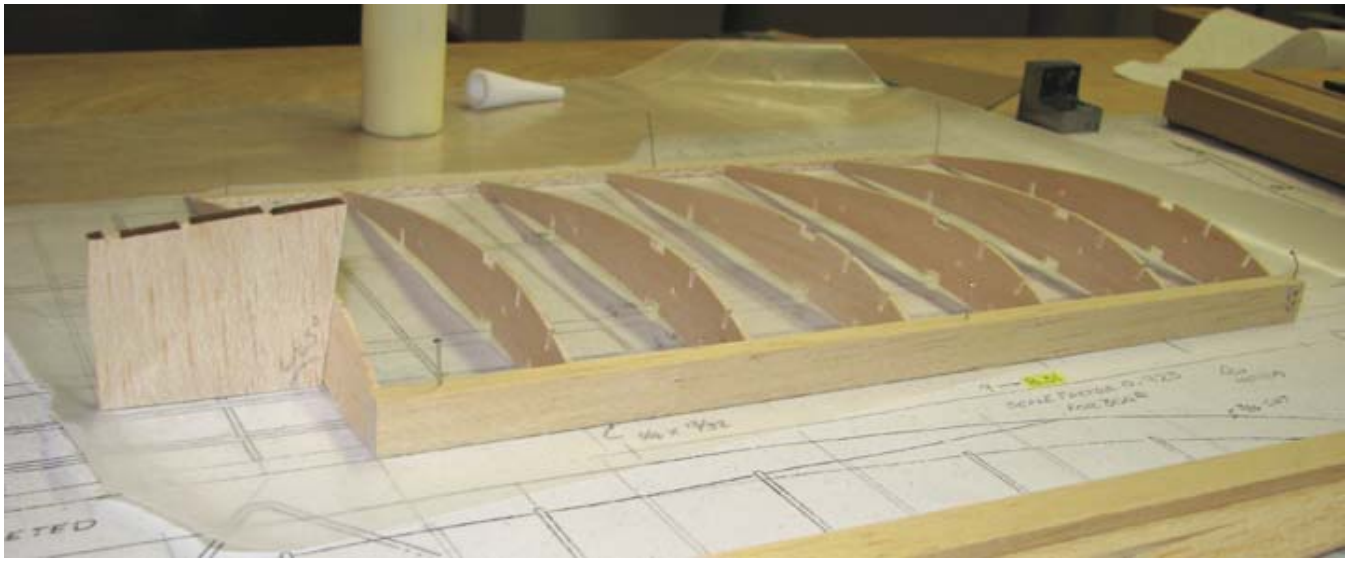
In order to lay out the wing's right inner panel, the dihedral and polyhedral inclination jigs had to be made. From Report No. 33 it was determined that the polyhedral break angle was 13.701 degrees. It is my custom to put half of this angle (13.701/2 = 6.85 degrees) on the end of the wing's inner panel and half on the end of the wing's tip panel. Since this angle is beyond 90 degrees, the angle of the inclination jig is 90+6.85 = 96.85 degrees. This angle was laid out on paper with a protractor as shown below.



Then using a piece of 3/16" balsa, one edge of the polyhedral inclination jig was cut and sanded to the proper angle as shown below.

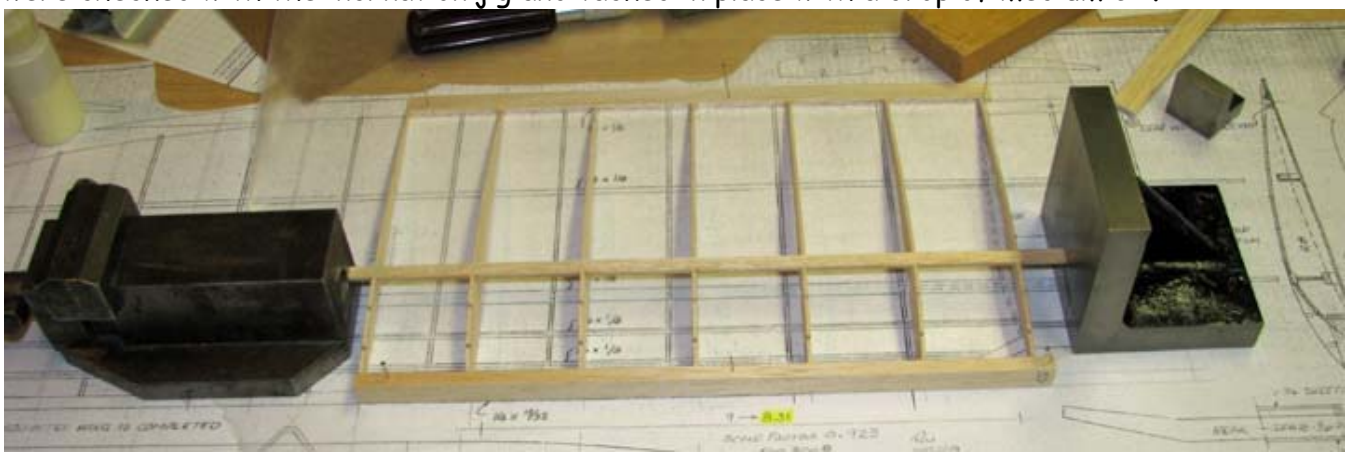


The 1/4" X 1/2" leading edge and the 1/8" X 1/2" trailing edge were pinned down on the right wing's inner panel. Then five of the R1 ribs were glued in place 90 degrees to the plan. The jig was used to set the inclination of the temporary polyhedral rib on the end of the inner panel as shown below.

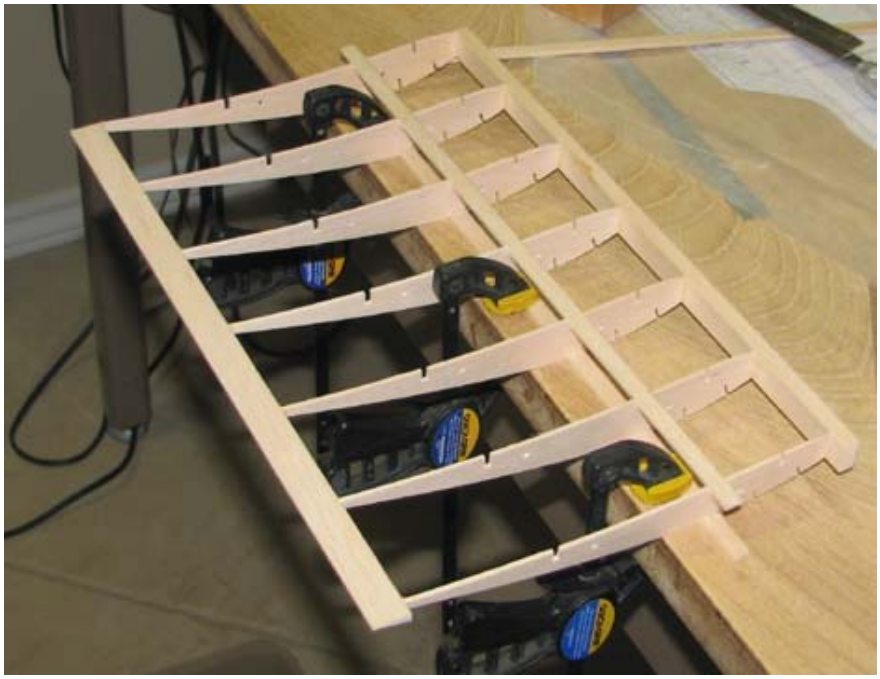


Again from Report No. 33, it was determined that the dihedral break angle was 6.76 degrees. Since this angle is small, the total angle was applied to the root of the wing's inner panel. Using same piece of 3/16" balsa, the other edge of the inclination jig was cut and sanded to the proper angle (96.76 degrees) and used to set the inclination of the inner panel's root rib as shown below.

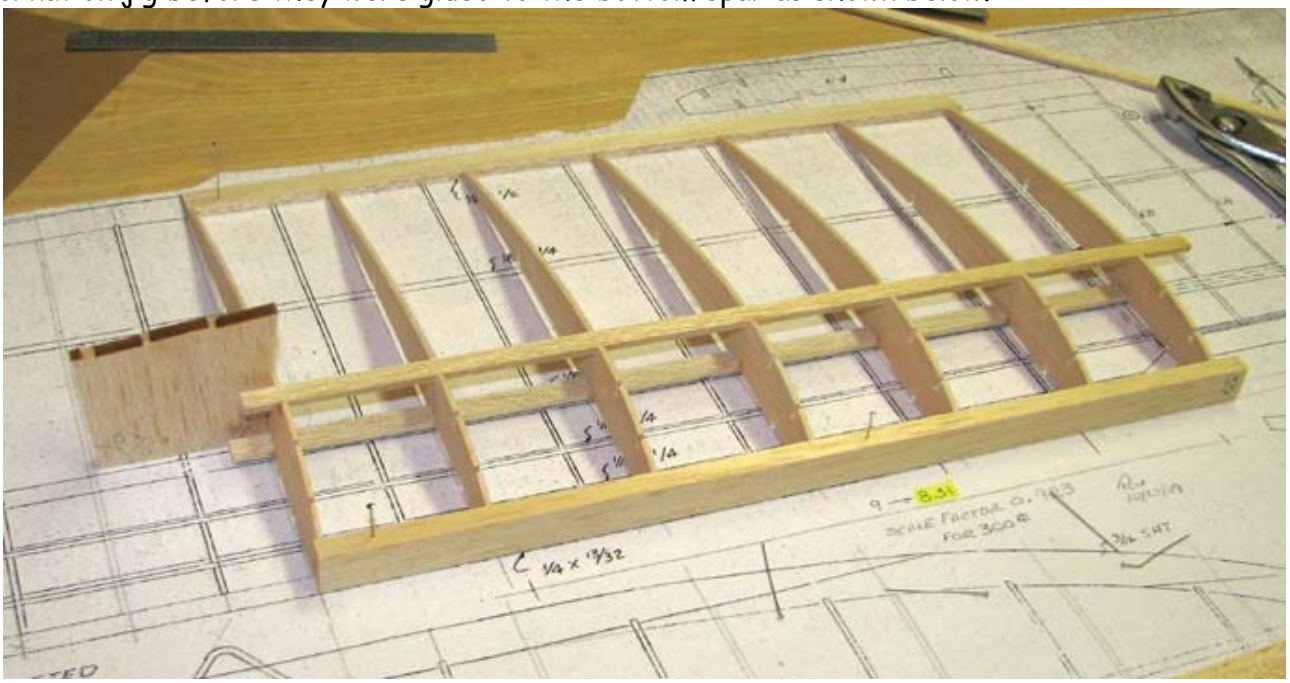
The main 3/32" X 1/4" top spar was placed in the rib cut outs without gluing. Heavy steel abutments were placed up against end of the spar to hold it in place spanwise. Then a small steel block square was used to check and adjust each R1 rib to 90 degrees on the main spar. Only the five R1 ribs were tacked in place with a drop of medium CA. Then the two inclined end ribs were checked with the inclination jig and tacked in place with a drop of medium CA.



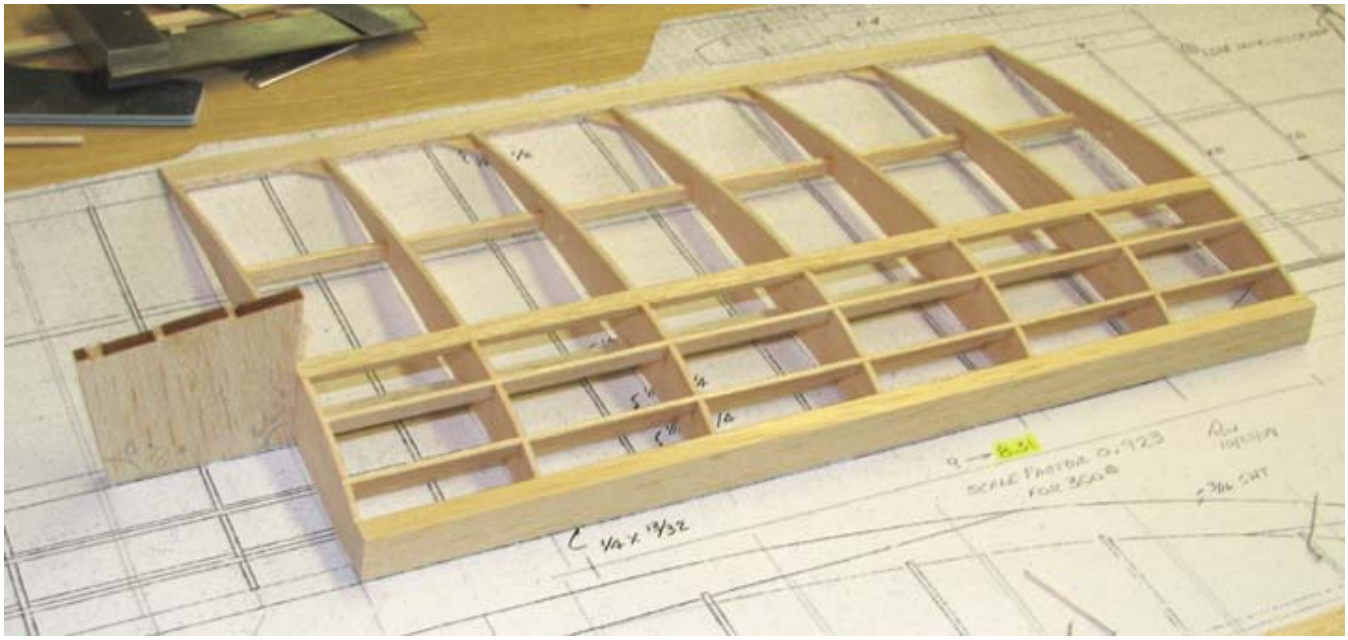
The wing's inner panel was removed from the plan. It was placed upside down on the work table and the top spar was clamped in three places with Quick Clamps. This is a measure to insure that the inner panel remains straight while the bottom main spar is glued on. Only the five R1 ribs were tacked in place with a drop of medium CA.



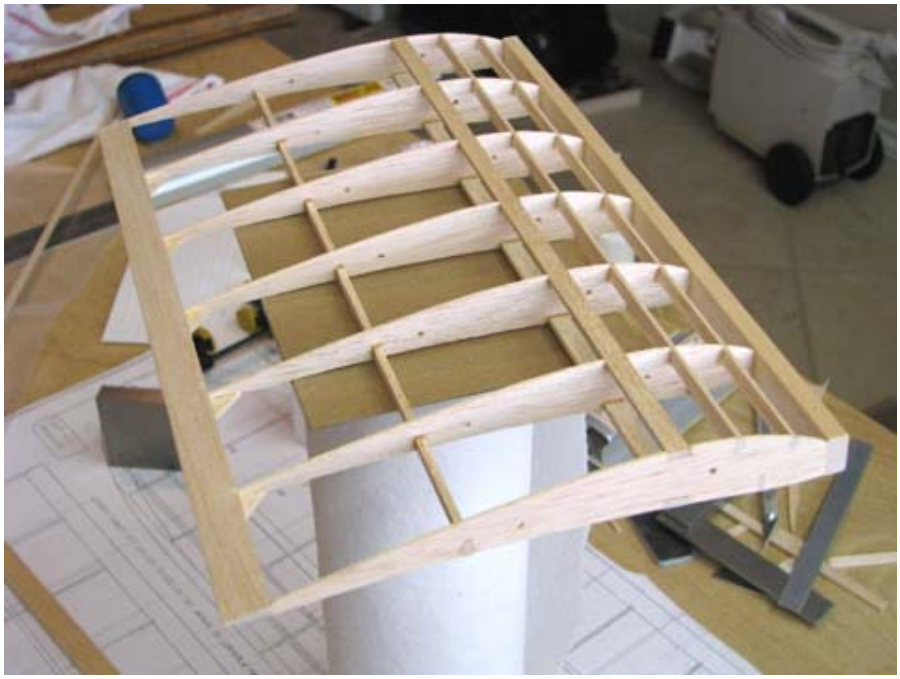
The inner panel was placed back on the plan and the two end ribs were checked with the inclination jig before they were glued to the bottom spar as shown below.



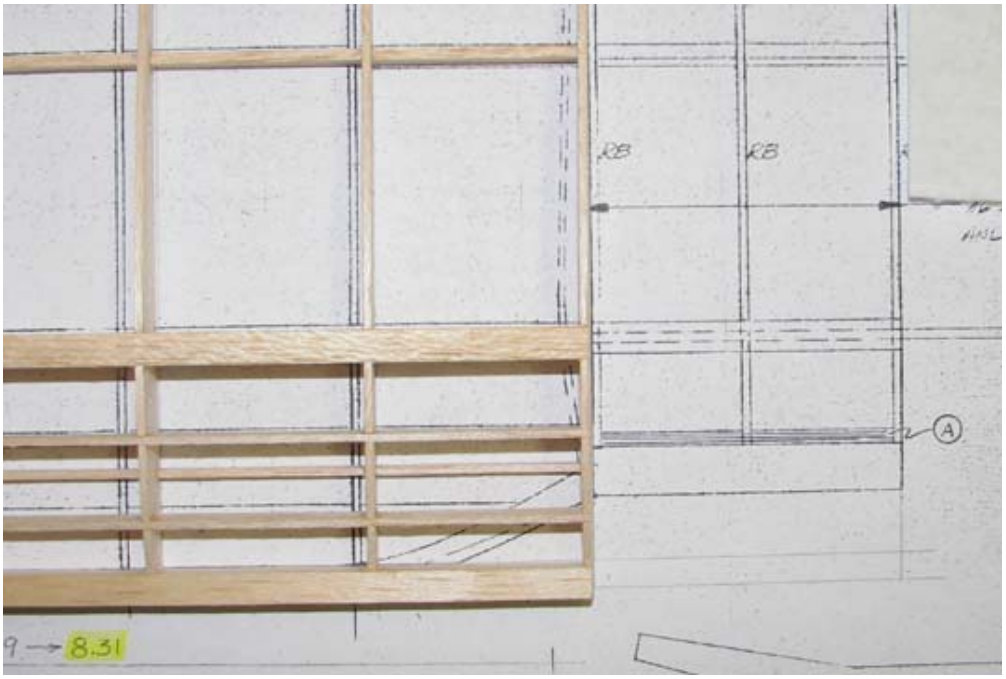
After the rear bottom 3/32" X 3/16" spar and the three 1/16" X 3/32" turbulator spars were glued in place, all of the spars were trimmed off and the temporary polyhedral rib bar sanded smooth. Again, the inclination of the temporary polyhedral rib was checked using the jig as shown below. This was also done on the inner panel's root rib. Notice also that 1/16" gussets have been added to the outboard side of the rib/trailing edge joints to strengthen the joint.



The picture below shows the wing's completed inner panel, except for the modification of the leading edge at the root.



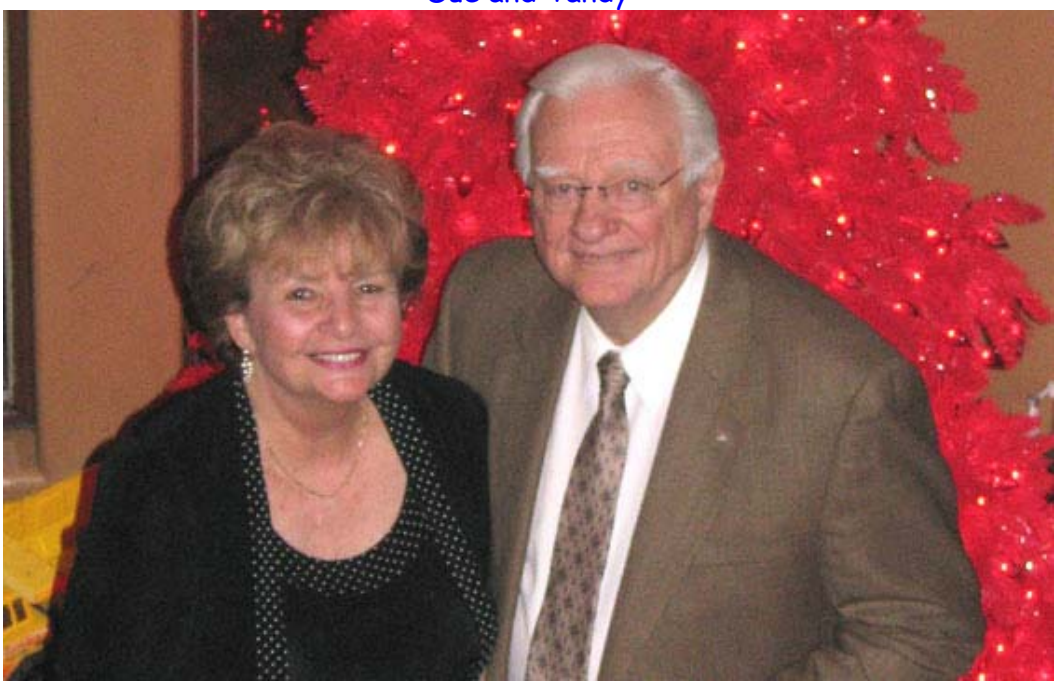
The picture below shows how the leading edge curves in at the root to mate with the center section. The wing will be built with a false straight leading edge until the center section's main spar carry through is completely assembled for accuracy purposes. Then this portion of the leading edge will be cut away and modified as per the plans below.



The wing's right tip panel will be built next. However, tomorrow is Christmas Eve and all modeling has to stop as Sue and I are having many guests and activities both tomorrow as well as Christmas day. so I will not get started on the right wing's tip panel until Saturday. So until then,.....

MERRY CHRISTMAS TO YOU ALL

Sue and Tandy



David Harding

From: Tandy Walker [tandyw@flash.net]
Sent: Monday, December 21, 2009 6:41 PM
To: Undisclosed-Recipient: ;@smtp103.sbc.mail.mud.yahoo.com
Subject: 33 Speed 400 Cloudster -Development of Cloudster Polyhedral Wing Geometry
Attachments: Cloudster Polyhedral Wing Calculations.xls

Speed 400 Cloudster Project

The validation for making a polyhedral wing instead of a dihedral wing on the Jim Adams Cloudster plans comes from the original Cleveland Cloudster plans shown below.

This report deals with the issue of developing the polyhedral wing geometry for the Jim Adams Cloudster plans using the Cleveland Cloudster plans. To begin, the measurements and calculations for the polyhedral wing shown on the original Cleveland Cloudster plans are as follows:

Note:

All calculations were performed in the attached Excel spread sheet.

Given:

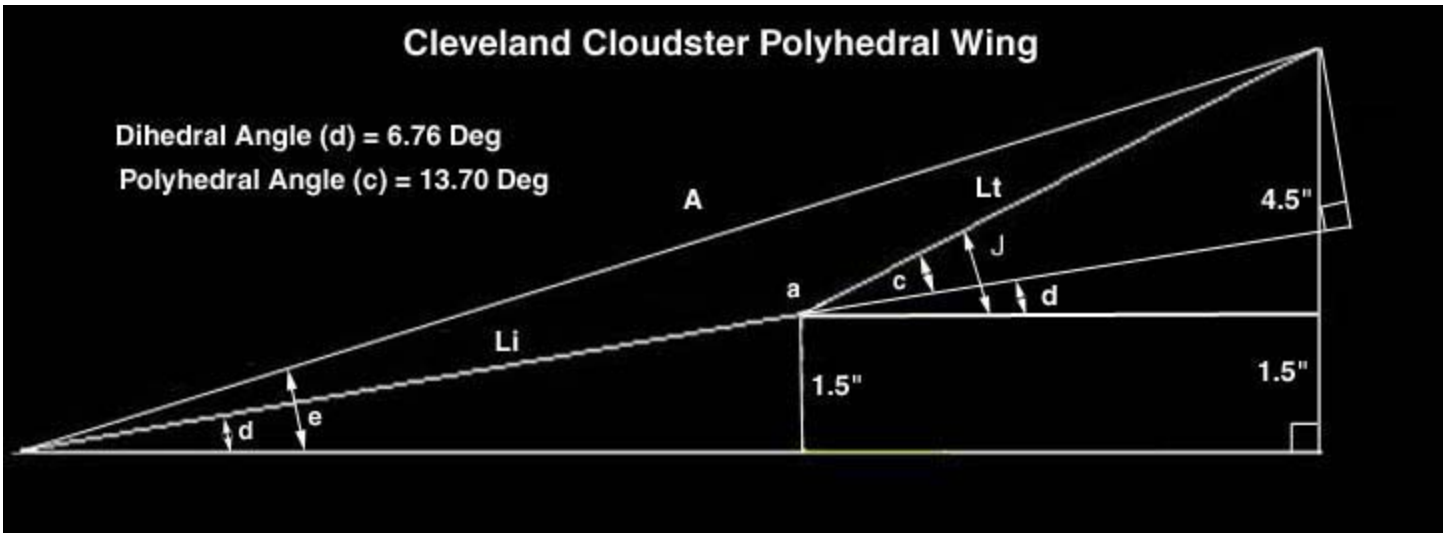
Inner Panel Span (Li) = 12-3/4" (12.750") measured
Tip Panel Span (Lt) = 12.-7/8" (12.875") measured
Inner Panel Vertical rise = 1-1/2" (1.50")
Tip Panel Vertical rise = 4-1/2" (4.50")

1. Tip Span (Lt) to Semi-Span (b/2) Ratio = 0.5024 <<<<<<<

2. Inner Panel Dihedral Angle (d) = ArcSin (1.5/Li) = 6.756 Deg <<<<<<<

3. Angle (J) = ArcSin (4.5/Lt) = 20.458 Deg

4. Tip Panel Polyhedral Angle (c) = J-d = 13.701Deg <<<<<<<



Now, with the above geometry and wing data, the measurements and calculations used to development of the Jim Adams Cloudster polyhedral wing are as follows:

Notes:

1. The wing center section will remain flat over fuselage for ease of wing attachment.

2.The wing's inner and tip panel angles were made the same on the Jim Adams plans as on the Cloudster plans.

Given:

Semi-span (b/2) = 23-15/16" (23.9375") measured

1/2 Center section Span (1/2 Lc/s) = 1.223" measured

Calculated Above:

Tip Span (Lt) to Semi-Span (b/2) Ratio = 0.5024

Inner Panel Dihedral Angle (d) = 6.756 Deg

Tip Panel Polyhedral Angle (c) = 13.701 Deg

1. Tip Span (Lt) = 0.5024 X 23.9375 = 12.027" <<<<<<<<

2. Inner Panel Span (Li') = 23.938-1.223-12.027 = 10.688" <<<<<<<< (measurement checks at 10-11/16")

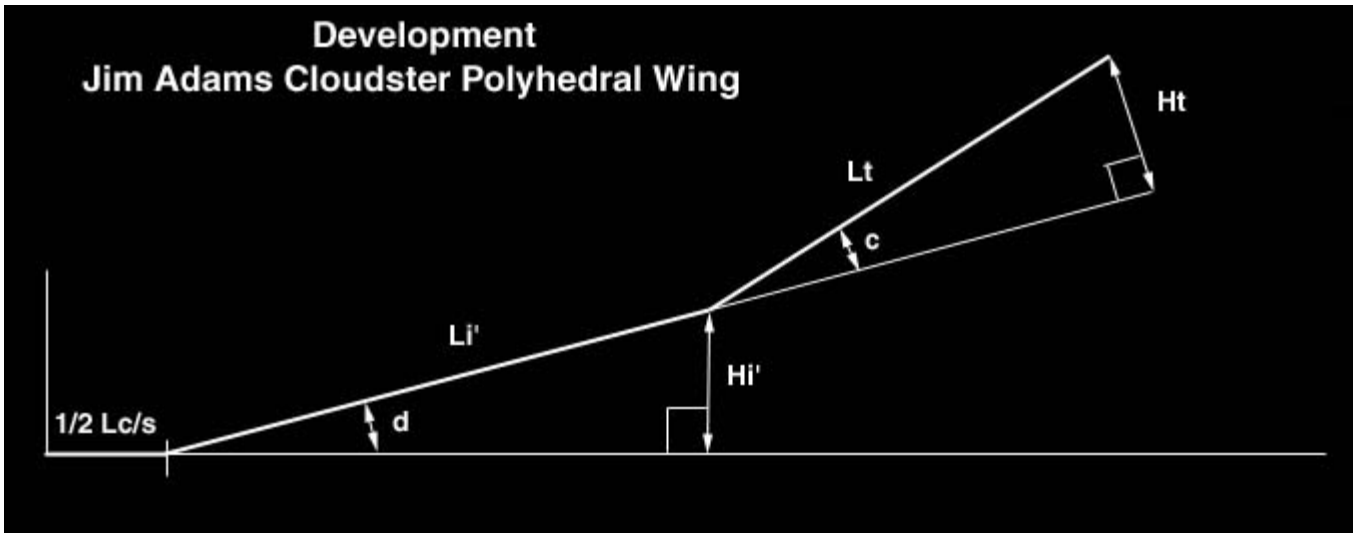
Note:

This will require changing the wing's rib spacing to make equal rib spacing with a rib falling at the polyhedral break.

3. New Rib Spacing = Li'/6 = 1.7813" <<<<<<<<

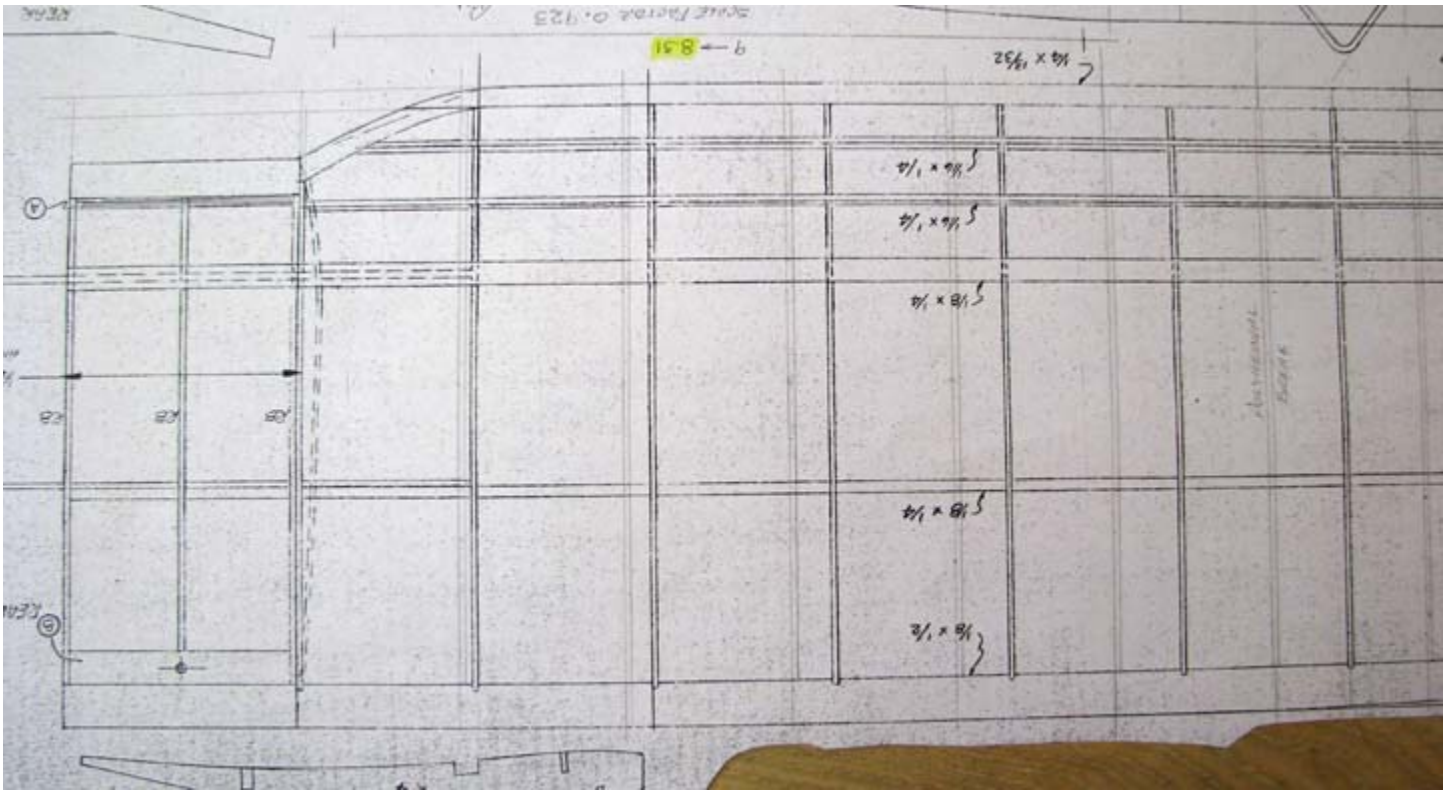
4. Inner Panel Vertical Rise (Hi') = Li' X Sin d = 1.257" <<<<<<<<

5. Tip Panel Vertical Rise (Ht) = Lt X Sin c = 2.849" <<<<<<<<

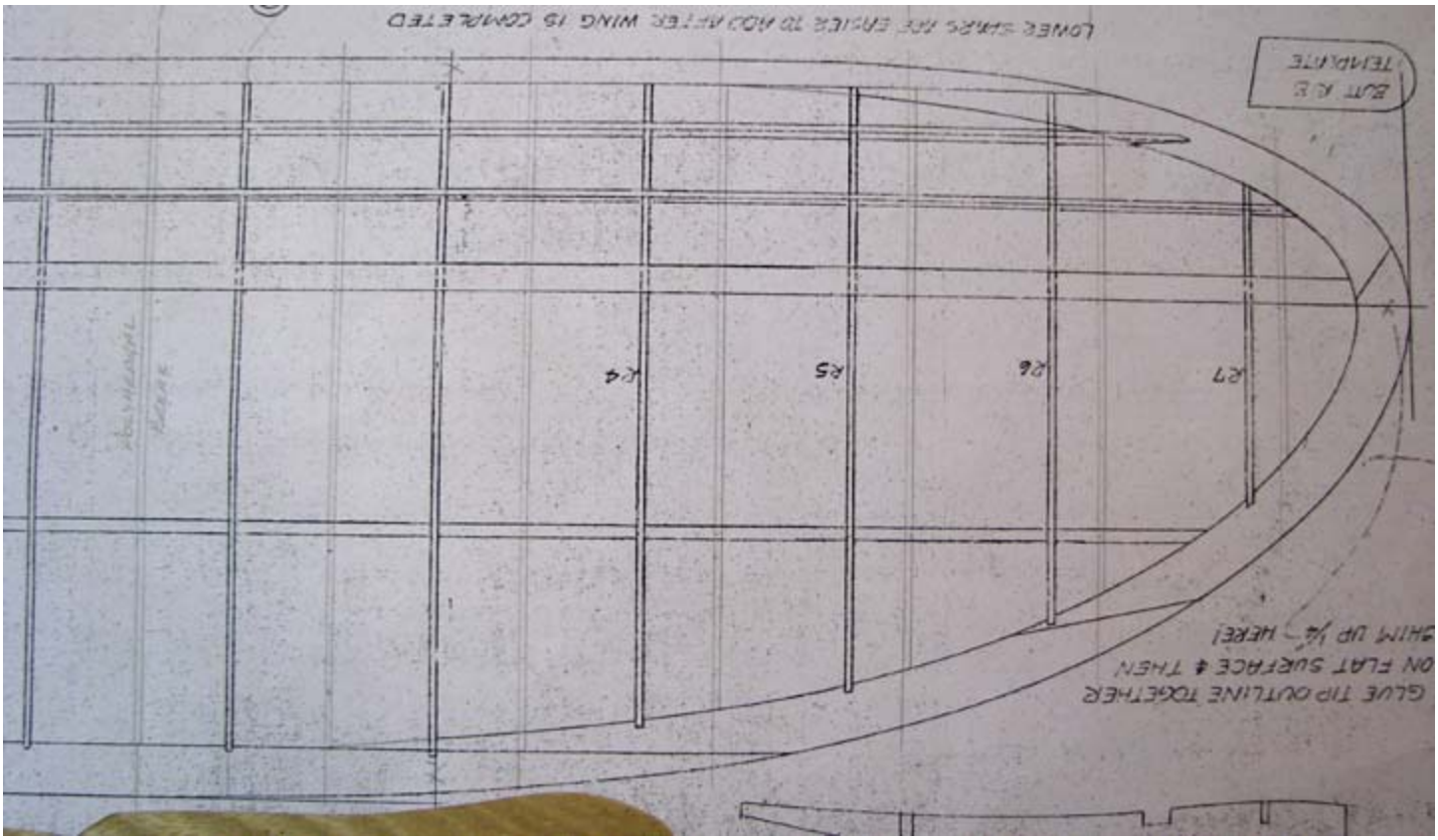


Based on the 1.78" rib spacing of Item No. 3 above, The new rib locations were drawn in on the Jim Adams wing plan as shown below.

Inner Panel



Tip Panel



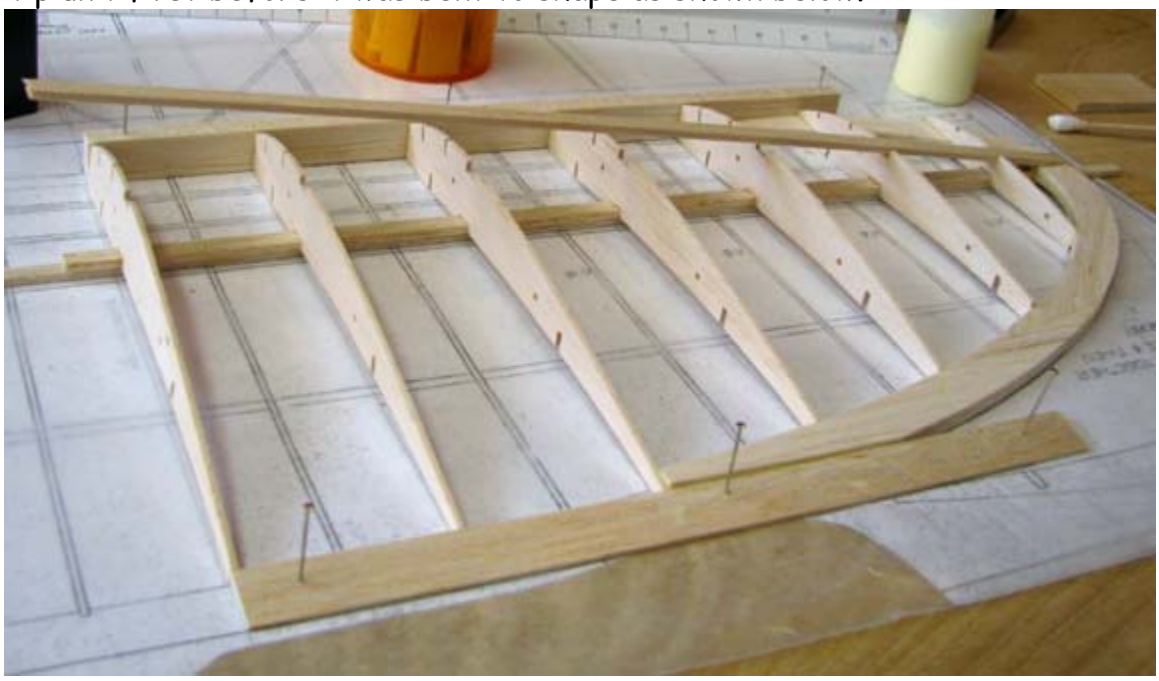
The parts are available and the geometry has been calculated so that tomorrow the construction of the Jim Adams Cloudster polyhedral wing can begin.....Tandy

David Harding

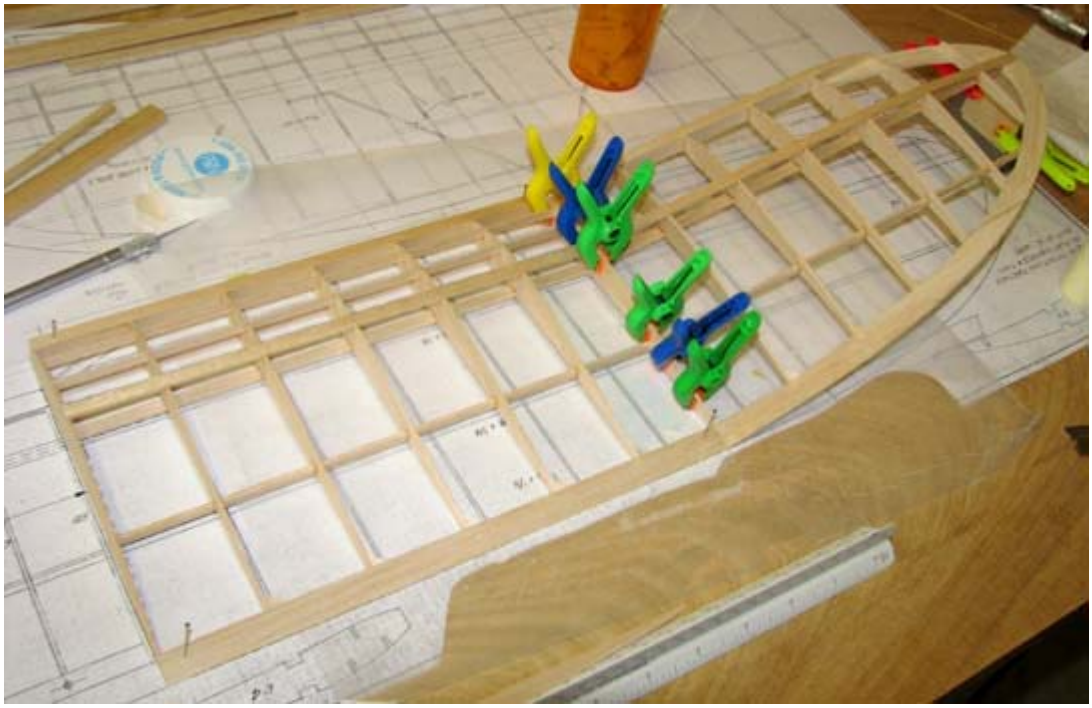
From: Tandy Walker [tandyw@flash.net]
Sent: Wednesday, December 30, 2009 2:57 PM
To: Undisclosed-Recipient: ;@smtp105.sbc.mail.mud.yahoo.com
Subject: 36 Speed 400 Cloudster - Joining Right Wing Panels

Speed 400 Cloudster Project

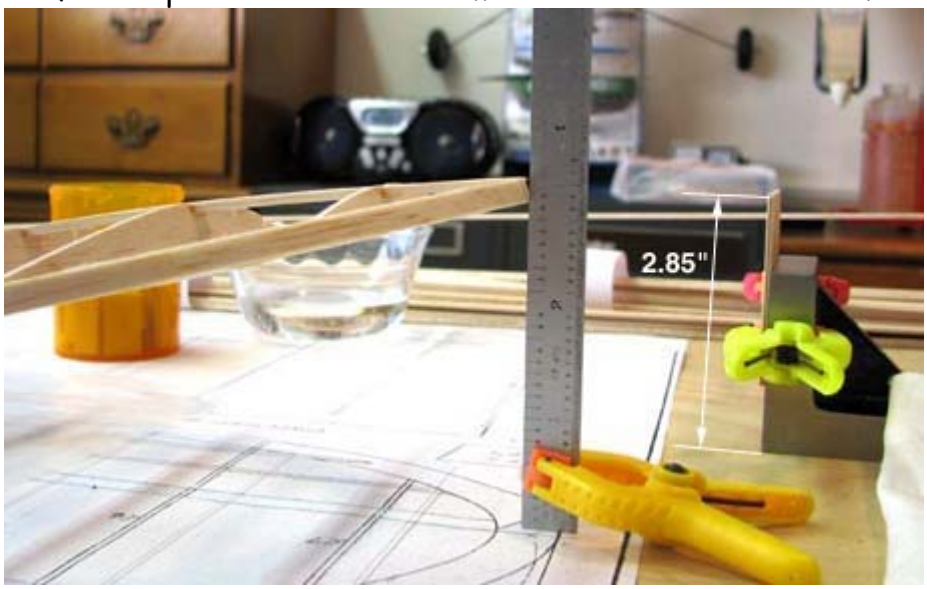
The four remaining tip ribs were glued in place over the relatively hard 3/32" X 1/4" balsa bottom spar. A medium 3/32" X 1/4" balsa strip was chosen for the top spar because it has to curve down out at the tip. Actually, the top spar was beveled and glued to the tip unit first before it was bent to shape as shown below.



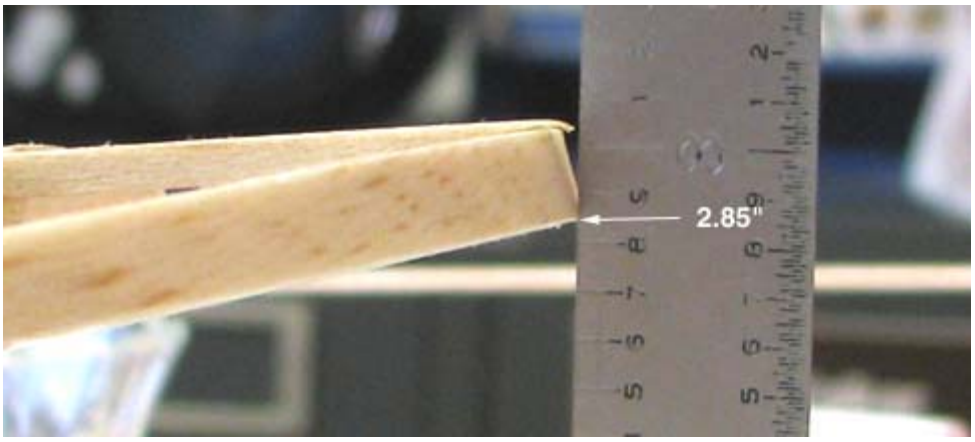
The wing's inner was pinned down over the plans and wing's tip panel was jigged up such that the tip was elevated off of the plan 2.85". A trial clamped fit was made without gluing to check the set up as shown below.



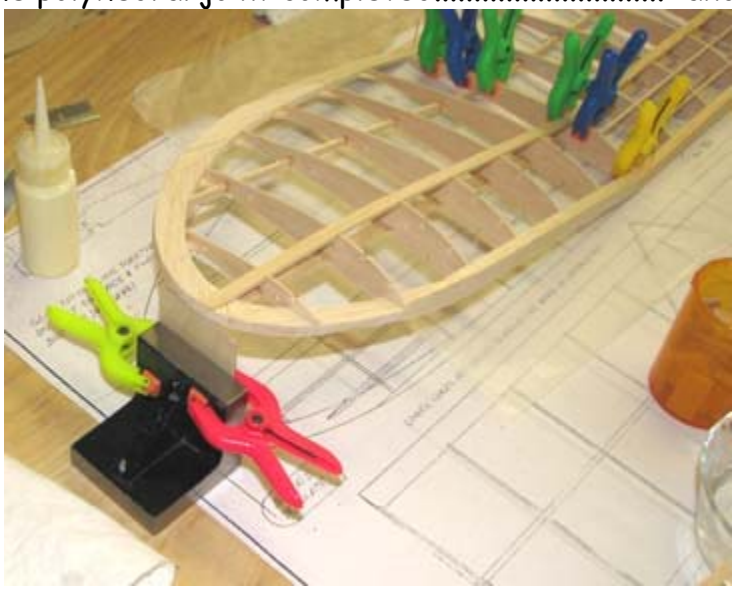
Notice the steel square with the plywood clamped to it at the right. This will be 2.85" jig brace placed under the wing tip when the two panels are glued together. A measurement check was made of the tip's elevation with a metal scale as shown below.



In this close up, you can see that the bottom of the wing tip is elevated exactly 2.85".



In the picture below, the right wing's inner and tip panels have been glued and clamped together with the 2.85" jig brace supporting the wing tip. This will be left to dry overnight. Then the two temporary polyhedral ribs will be removed so that the main spars can be braced and the polyhedral joint completed.....Tandy

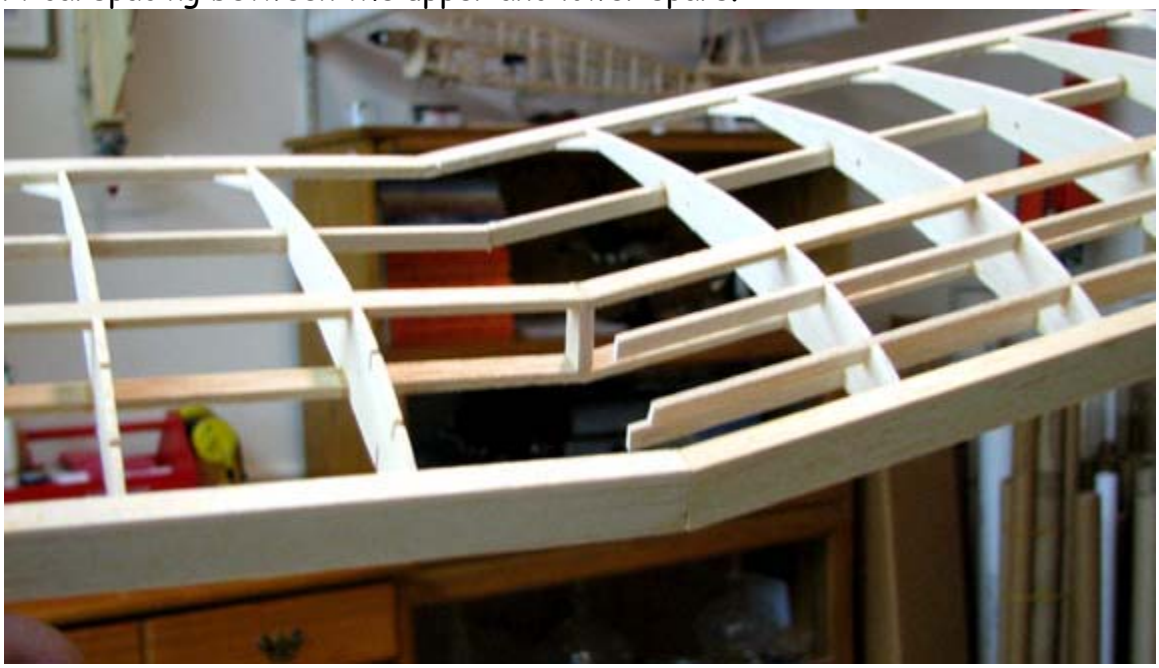


David Harding

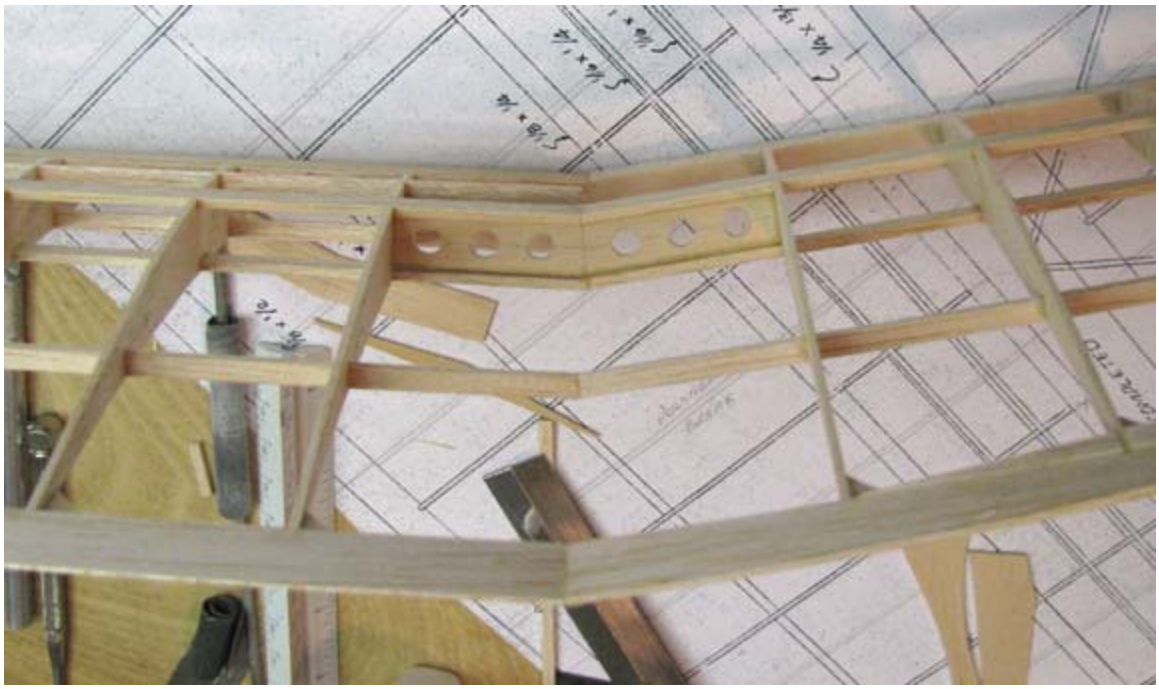
From: Tandy Walker [tandyw@flash.net]
Sent: Thursday, December 31, 2009 10:30 PM
To: Undisclosed-Recipient: ;@smtp104.sbc.mail.mud.yahoo.com
Subject: 37 Speed 400 Cloudster - Right Wing Polyhedral Joint

Speed 400 Cloudster Project

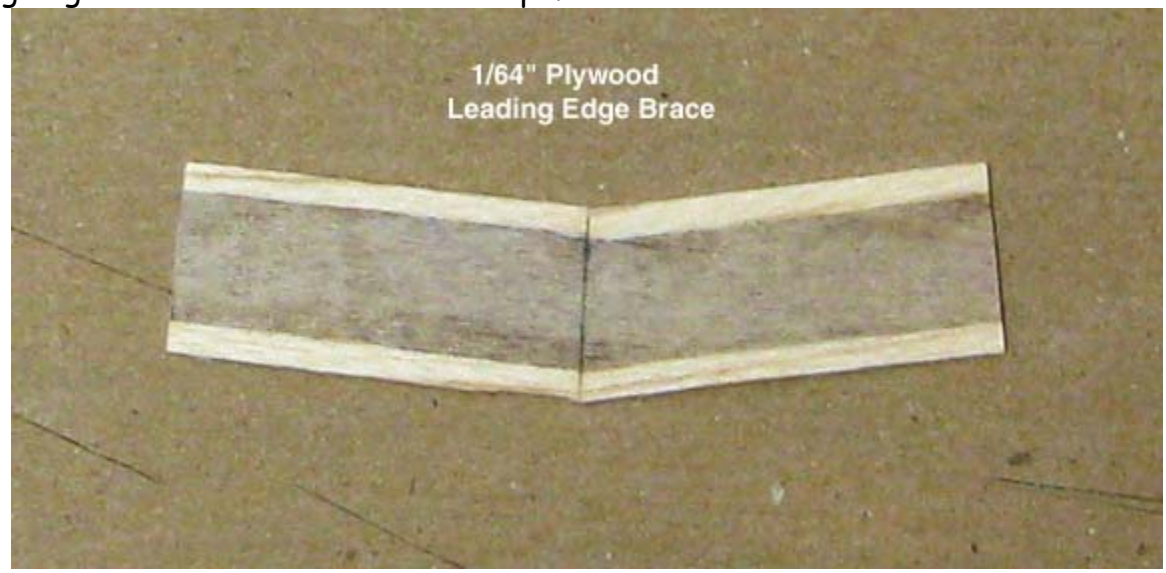
After the right wing's glued and clamped inner and tip panel joint had dried overnight, the right wing was removed from the plan. Then with great care, the two temporary polyhedral ribs that had been clamped together were carefully cut into sections and removed as shown below. Notice that the portion of the two temporary polyhedral ribs between the upper and lower 3/32" X 1/4" main spars was left in place. This preserves the vertical spacing between the upper and lower spars.



In order to fabricate a plywood polyhedral brace that will fit between the two main spars, a template was drawn by pressing a trimmed sheet of 1/16" up against the forward face of the main spars and tracing an outline from the rear inside the two spars. The 1/16" balsa template was cut out as shown below.

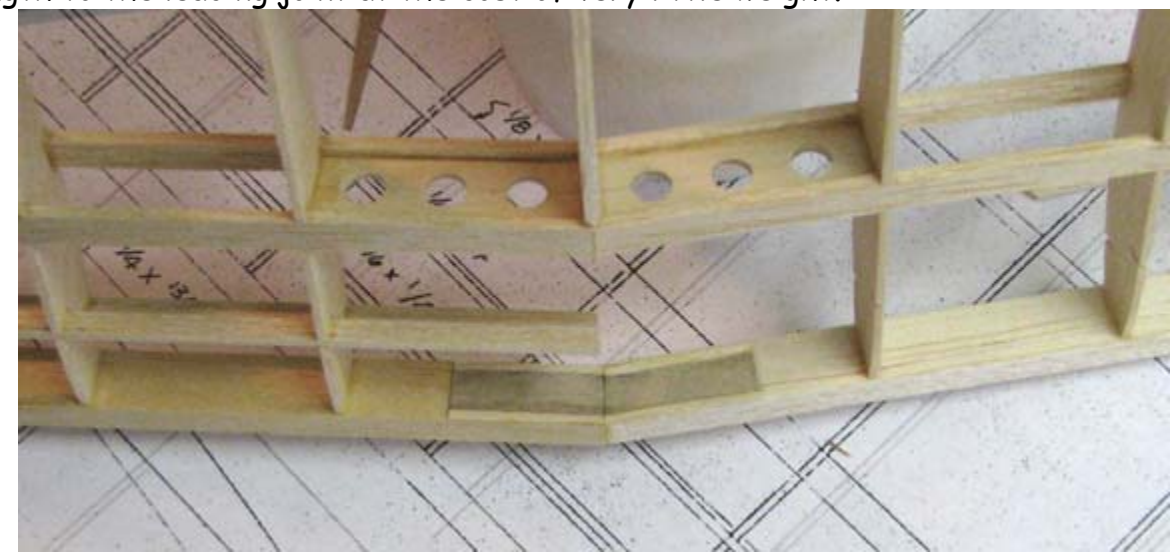


Even though there is a large cross sectional gluing area on the 1/4" X 1/2" leading edge, a leading edge brace was made out of 1/64" plywood to add further support. The brace's edges were lined with balsa as shown below so they would sand smoothly when the balsa leading edge is carved and sanded to shape.



The leading edge brace was glued with aliphatic glue and clamped to the inside face of the leading edge as shown below.

Once dry, the clamps were removed, which is shown below. This brace adds considerable strength to the leading joint at the cost of very little weight.



Using the R1 plywood template made in Report No.29, a polyhedral rib was made from 3/32" sheet balsa. The polyhedral rib was made thicker for attaching the wing covering to. This rib was had a 1/16" strip cut from the center for the polyhedral brace as shown below.

The two segments of the polyhedral rib was glued into place and the trailing edge polyhedral joint was reinforced with two large 1/16" gussets (0.6" on a side) as shown below.

This shows the polyhedral rib glued in place from the top side.

Next the three 1/16"" X 3/16" turbulator spars will be added to the wing's tip panel and the wing tip will be trimmed and sanded to final shape.

HAPPY NEW YEAR

.....Tandy.....

David Harding

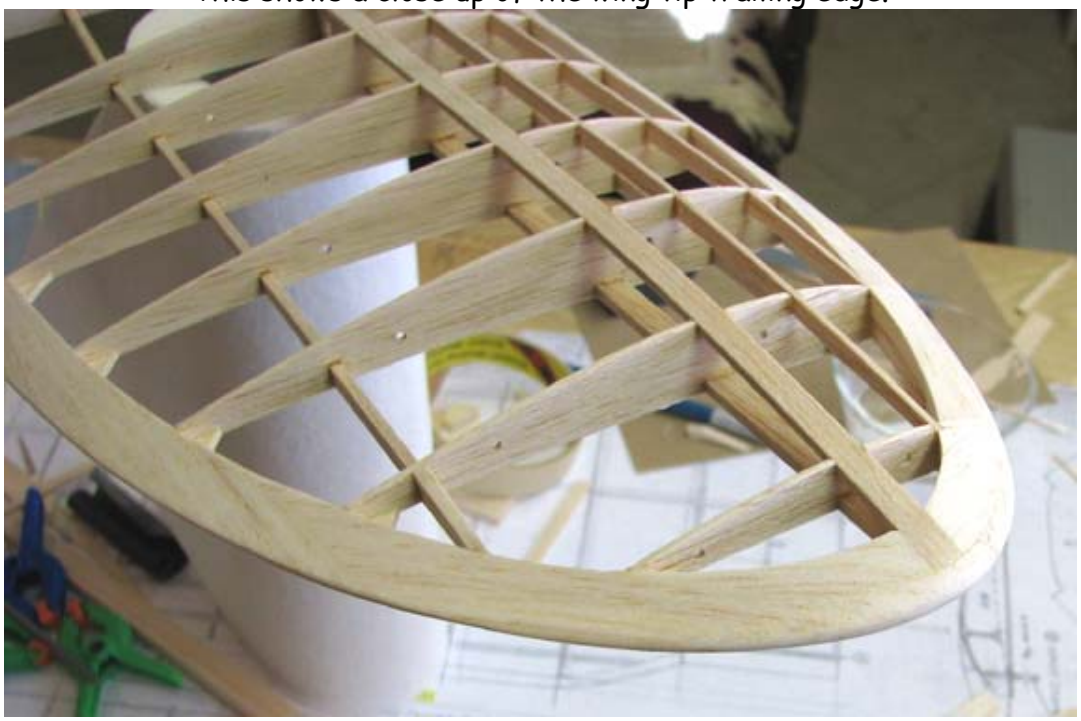
From: Tandy Walker [tandyw@flash.net]
Sent: Friday, January 01, 2010 2:27 PM
To: Undisclosed-Recipient: ;@smtp108.sbc.mail.mud.yahoo.com
Subject: 38 Speed 400 Cloudster - Right Wing Tip Complete

Speed 400 Cloudster Project

This morning I glued in the three 1/16" X 3/16" turbulator spars in the wing's right tip panel and then spent most of the rest of the day working on finishing out the wing tip. Filler blocks were cut from very soft 3/16" sheet balsa and glued in place on top of the wing tip pieces. These were carved, trimmed, and sanded to final shape as shown in the picture below.

This shows a close up of the wing tip leading edge.

This shows a close up of the wing tip trailing edge.



This picture shows the bottom of the finished wing tip.

The right half of the wing currently weighs 24 grams (0.85 oz) as shown below. However, this will come down some because close to 40% of the 1/4" X 1/2" leading edge will be removed when the leading edge is carved and sanded to final shape. So the complete wing structure, including the flat center section, should weigh no more than between 1.8 to 2.0 ounces.

The fuselage including the tail assembly, push rods, two servos, landing gear, motor with motor

mount, and spinner weighs 175 grams (6.17 oz) as also shown below. So including the estimated wing structural weight of 2 oz, the current Cloudster weight is 8.17 oz, just barely over half the Speed 400 event minimum weight requirement of 16 oz. Wonder if this Cloudster can be brought in at or near the minimum weight of 16 oz. Any comments?

Now, next week the left half of the wing will have to be built. During this time, there will be no Cloudster reports posted because they would be redundant. The Cloudster reports will resume when construction on the wing's center section begins and the two halves of wing are jointed to the center section.....Tandy

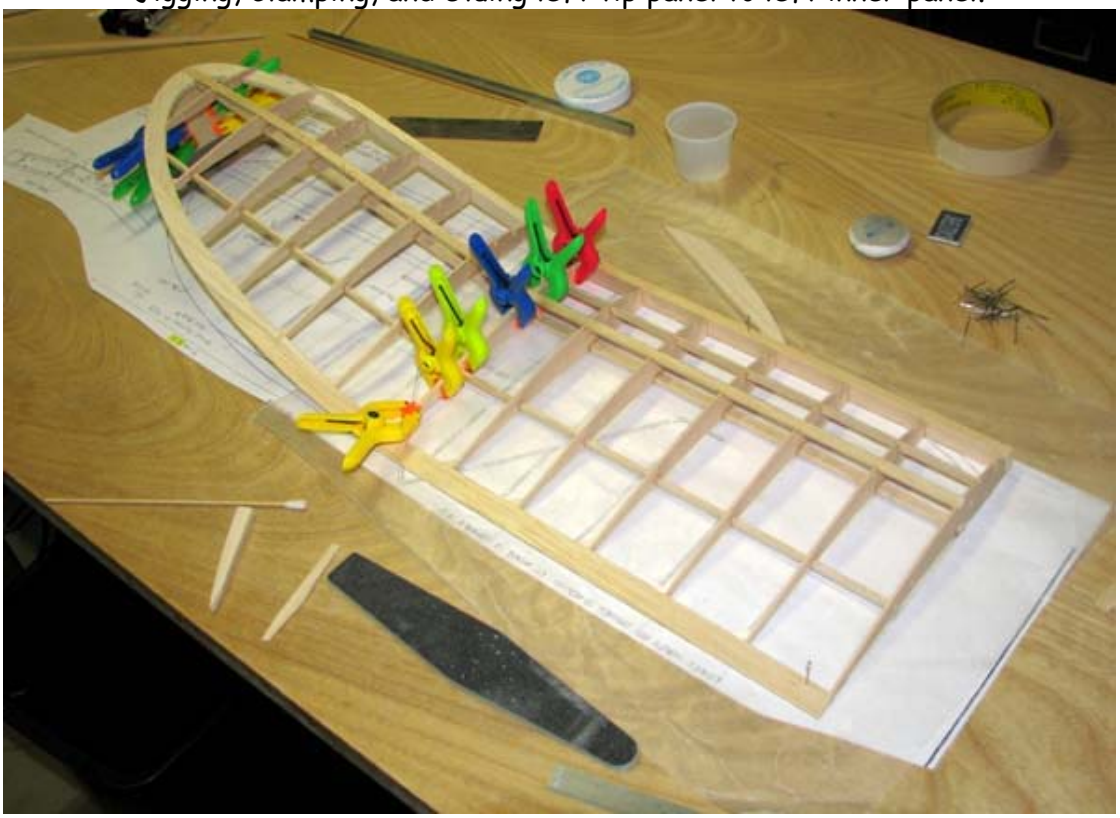
David Harding

From: Tandy Walker [tandyw@flash.net]
Sent: Thursday, January 07, 2010 2:51 PM
To: Undisclosed-Recipient: ;@smtp104.sbc.mail.mud.yahoo.com
Subject: 39 Speed 400 Cloudster - Left Wing Half Complete

Speed 400 Cloudster Project

Here are summary pictures of the construction of the left half of the wing.....Tandy

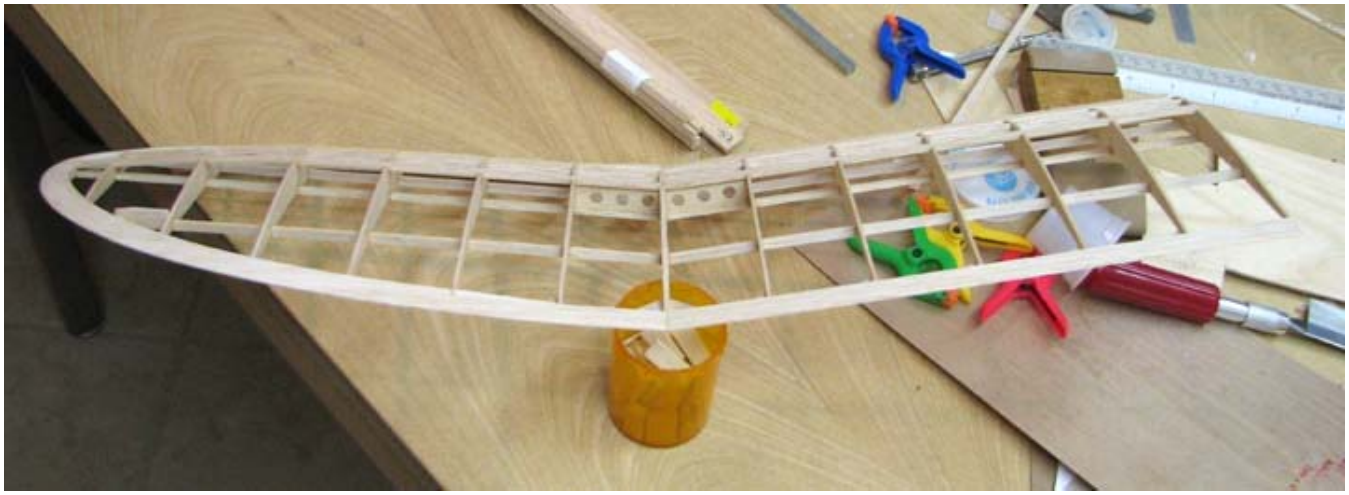
Jigging, Clamping, and Gluing left tip panel to left inner panel.



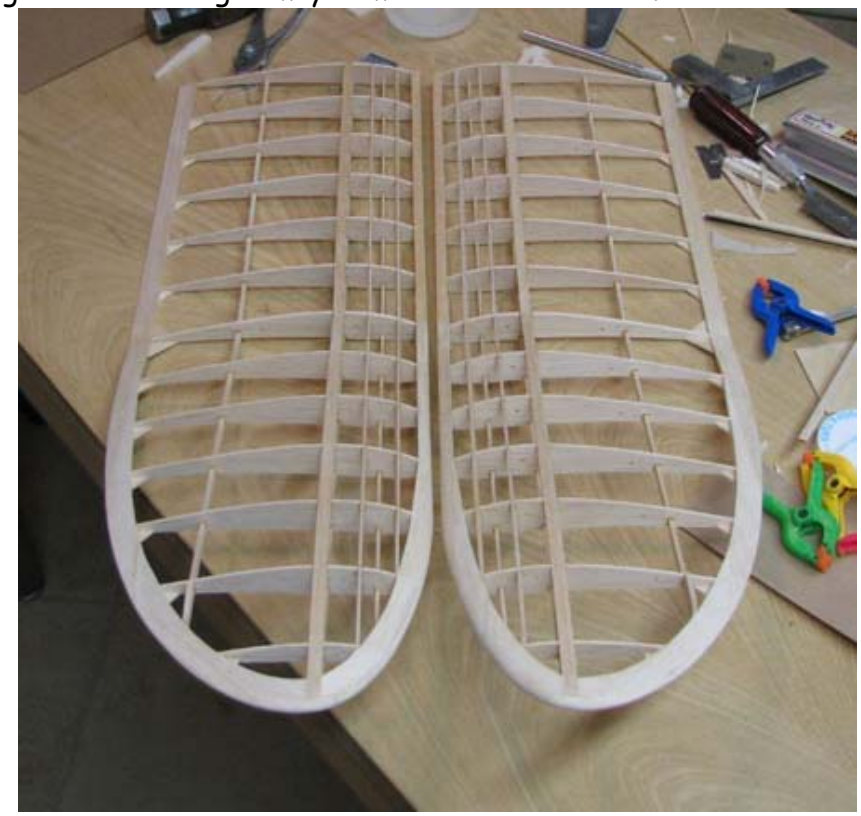
Block Filling the wing Tip with Soft Balsa.

1/16" Plywood Polyhedral Brace.

This shows a picture of the finished left half of the wing with the plywood brace glued in place.



This picture shows both the right and left halves of the finished wing. Each half weighed in identically at 23 grams (0.81 oz) for a total weight of 1.62 oz without the center section. It looks like the wing structure weight may come in at or near 2 oz.



Barring tomorrow unforeseen events, I will build the center section and join the wing halves.....Tandy

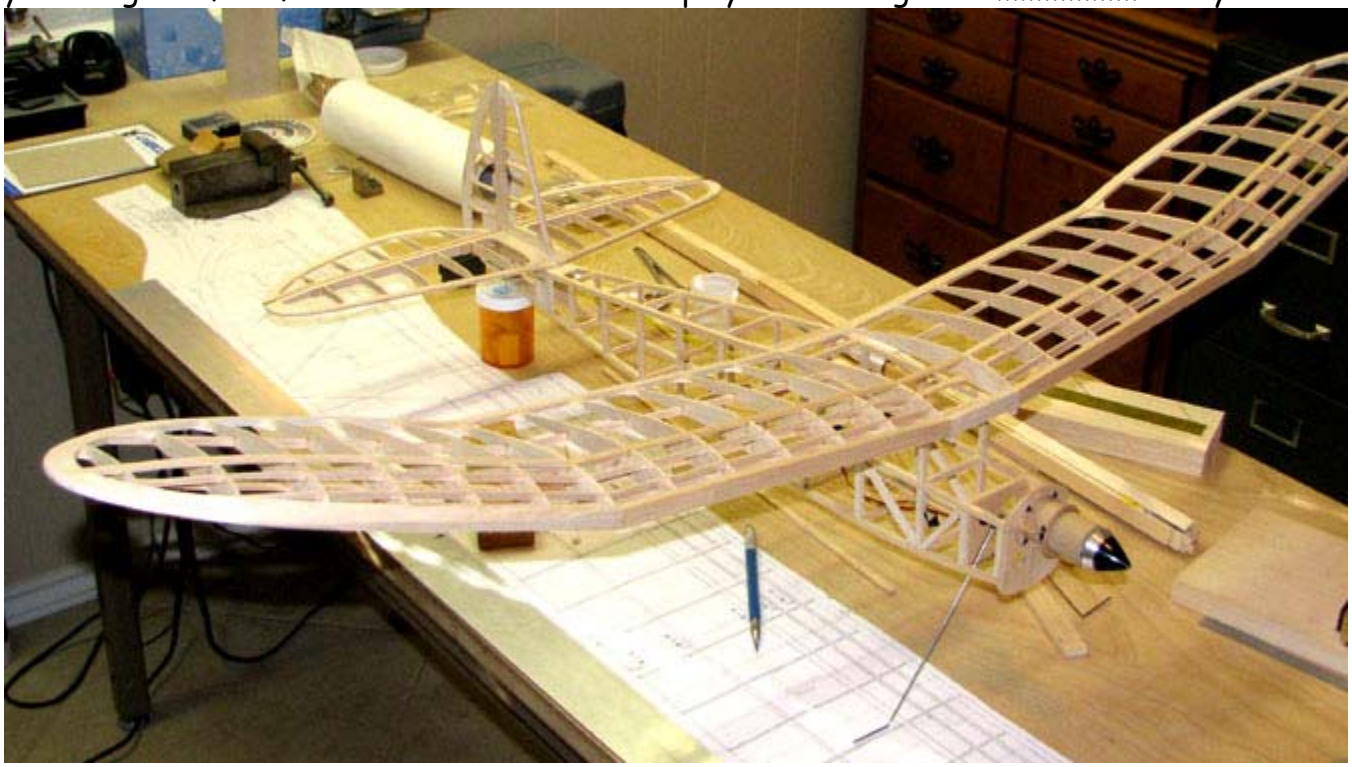
David Harding

From: Tandy Walker [tandyw@flash.net]
Sent: Saturday, January 09, 2010 9:38 AM
To: Undisclosed-Recipient: ;@smtp108.sbc.mail.mud.yahoo.com
Subject: 41 Speed 400 Cloudster - Polyhedral Wing on the Fuselage

I forgot to change the number and title of the report I sent this morning.
If you are saving the Cloudster reports, please replace it with this corrected one.

Speed 400 Cloudster Project

This morning I took the wing up off of the plans and carefully glued in the center section's bottom main spar. This now has the two wing halves accurately and securely tied together so that remaining construction of the center section can continue. Today I will be working on making the plywood main spar carry through brace support, installing the recessed leading edge parts, and finalizing the design of the wing attachment to the fuselage. However, I did place the the wing on the fuselage and took the picture below so you can get a feel for how a Cloudster with a polyhedral wing looks.....Tandy

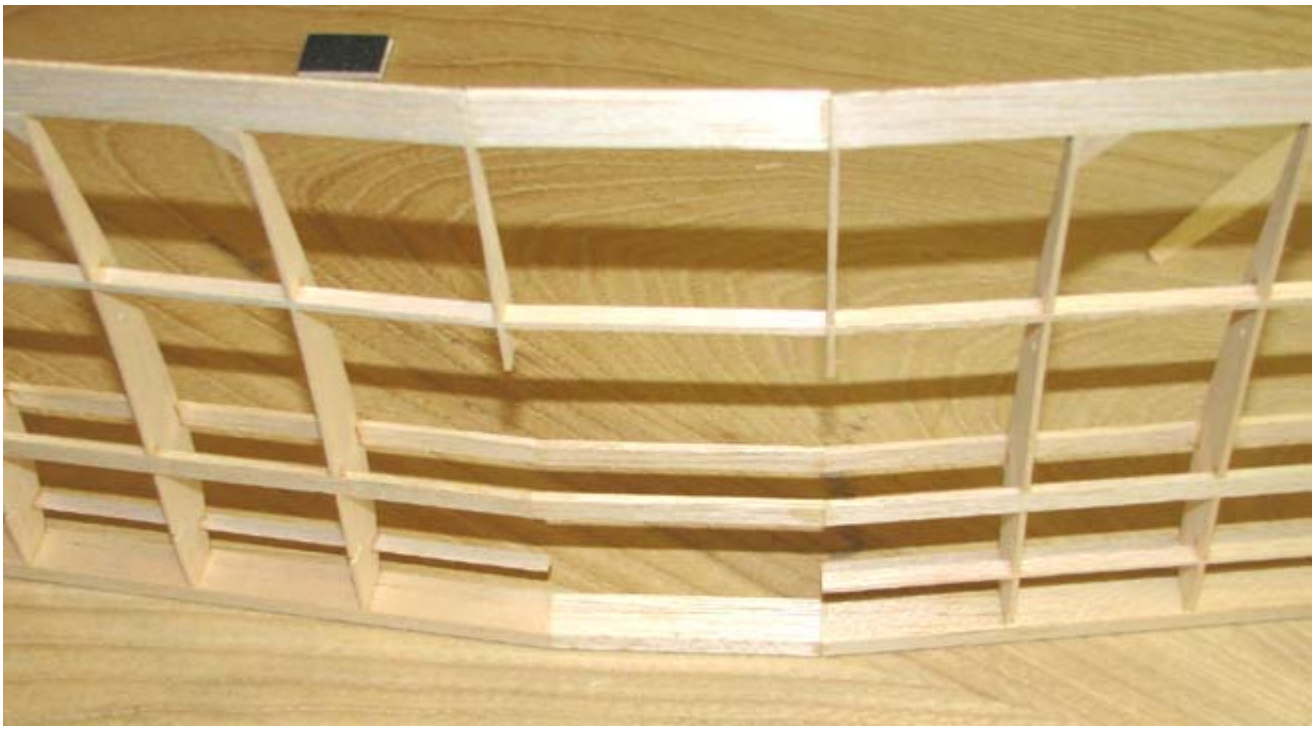


David Harding

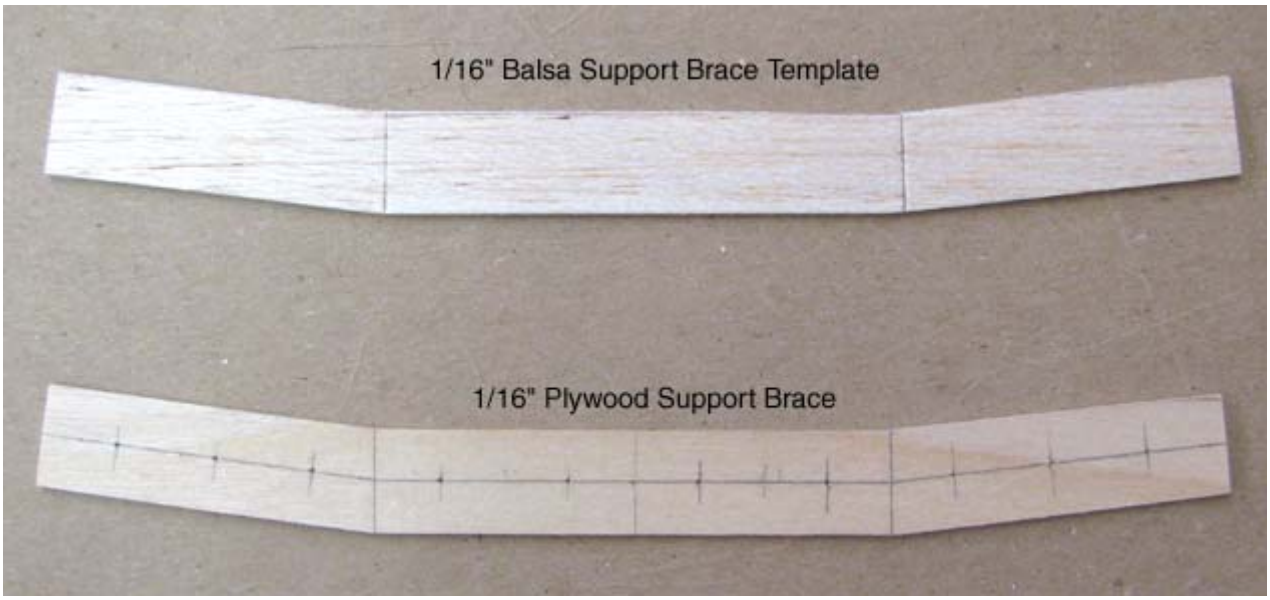
From: Tandy Walker [tandyw@flash.net]
Sent: Saturday, January 09, 2010 2:53 PM
To: Undisclosed-Recipient: ;@smtp108.sbc.mail.mud.yahoo.com
Subject: 42 Speed 400 Cloudster - Wing's Center Section Support Brace

Speed 400 Cloudster Project

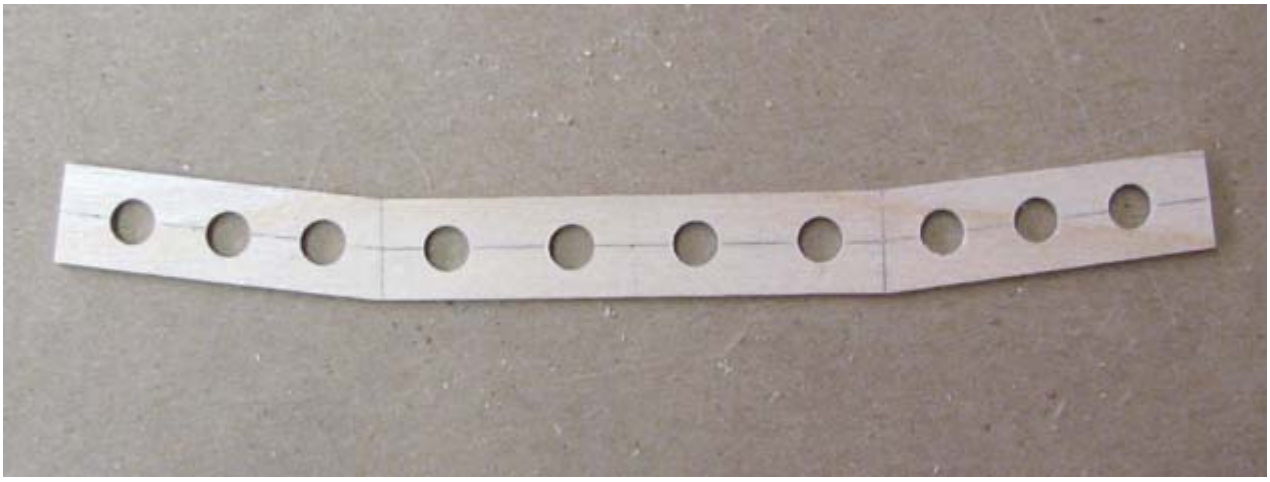
Now that the two wing halves are joined together, the remaining construction of the center section can continue. The first task was to remove a portion of the two temporary R1 ribs on either side of the center section as shown below.



In an earlier step, portions of the two temporary center section ribs between the upper and lower 3/32" X 1/4" main spars were left in place to preserves the vertical spacing between the upper and lower spars. In order to fabricate a plywood polyhedral support brace that will fit between the two main spars and bridge the center section, a template was drawn by pressing a trimmed sheet of 1/16" balsa up against the rear face of the main spars across the center section and tracing an outline from the front inside the two spars. The 1/16" balsa template was cut out as shown in the upper portion of the picture below. The balsa template was then placed on a sheet of 1/16" plywood and the pattern traced onto the plywood. The plywood support brace was cut out and sanded to fit in between the two main spars, which is shown in the lower portion of the picture below.



As part of the Cloudster's on going weight saving effort, ten 1/4" lightening holes were carefully located and made in the plywood support brace as shown below before it was glued into the center section.



The finished plywood support brace was then slipped into place between the two main spars. The 1/4" wide spars are much wider than the 1/16" brace. Since the main spars are 1/4" wide, the brace will be centered inside the spars when there is a 3/32" distance between the edges of the spars and the brace (i.e., 3/32 + 1/16 + 3/32 = 1/4). Therefore a piece of 3/32" balsa was used to center the brace before it was permanently glued in place as shown below.

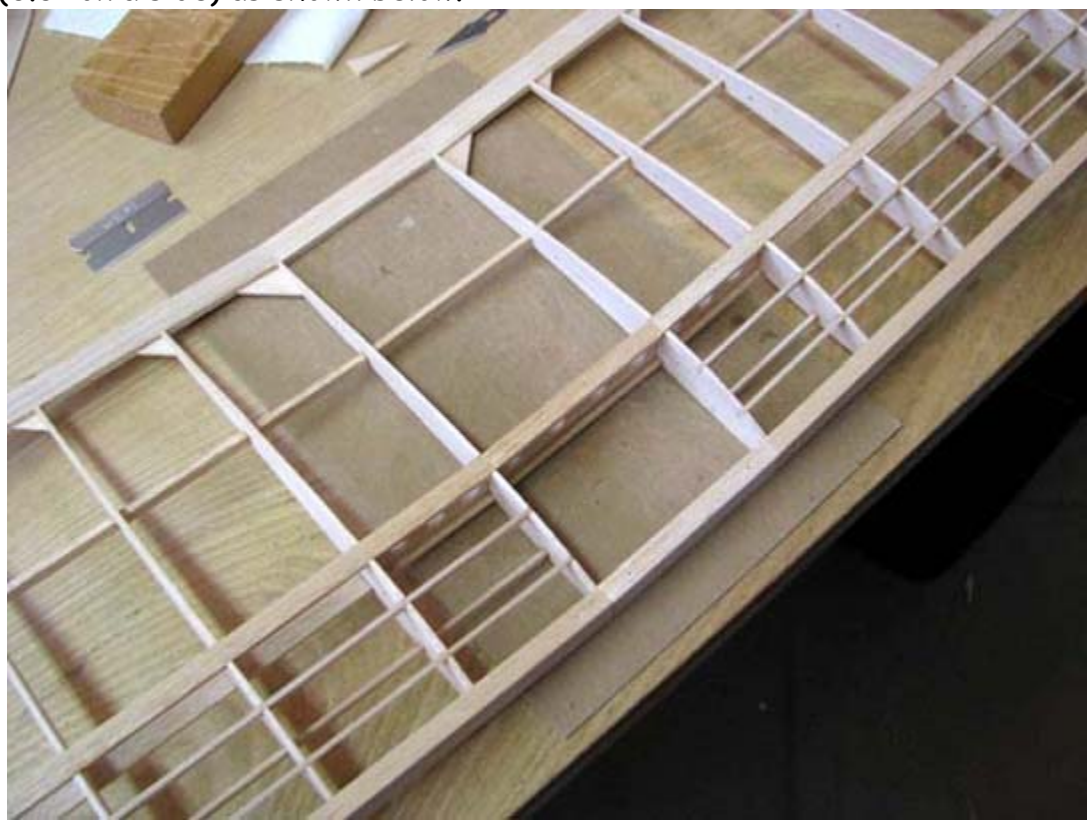
Work was stopped for today as the final design of the wing attachment to the fuselage has not yet been completed.....Tandy

David Harding

From: Tandy Walker [tandyw@flash.net]
Sent: Monday, January 11, 2010 12:07 PM
To: Undisclosed-Recipient: ;@smtp105.sbc.mail.mud.yahoo.com
Subject: 43 Speed 400 Cloudster - Wing Tip Vertical Rise Accuracy

Speed 400 Cloudster Project

Before starting work on recessing leading edge, it is instructive to measure and compare the "as built" overall vertical rise of each wing tip with the design value while the temporary leading edge is still in place. The wing's inner panel end R1 rib replacements were glued in place, including the portion all the way forward to the temporary leading edge as shown below. Notice that the three turbulator spars are extend to these end R1 ribs as well and the trailing edge dihedral joint was reinforced with two larger 1/16" gussets (0.6" on a side) as shown below.



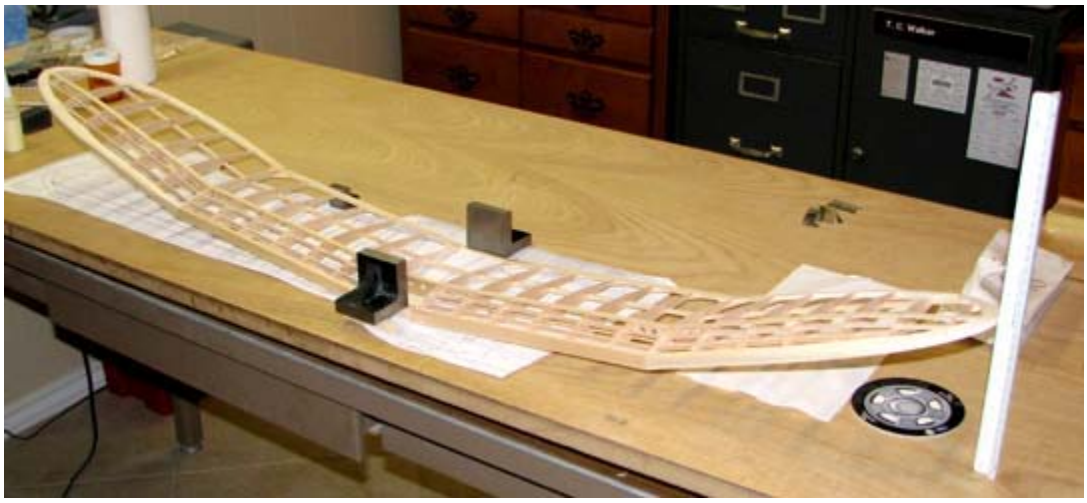
The design value of the wing's vertical rise at the tip can be calculated from Report No. 33 as follows:

Design Vertical Rise = Hi' + Lt X Sin(J)

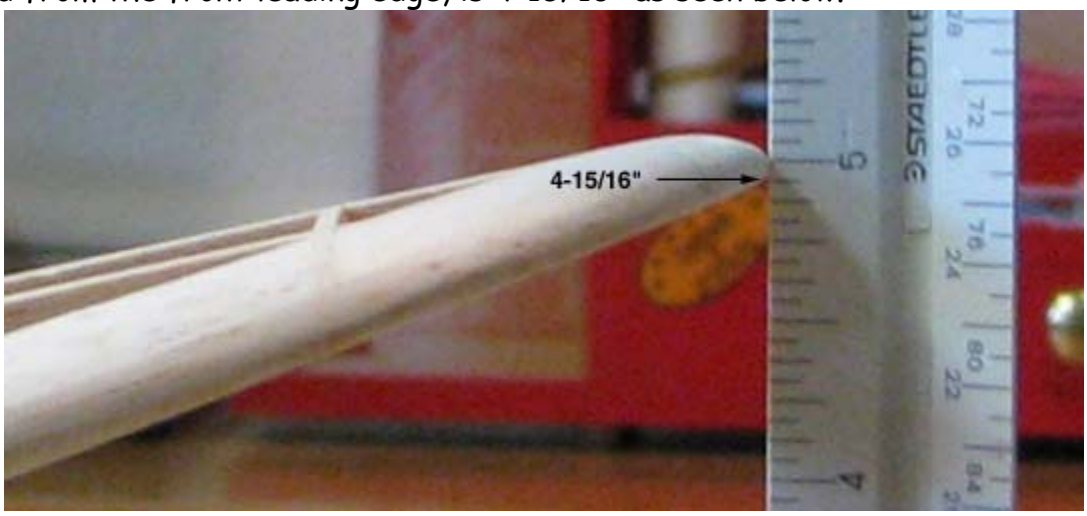
Design Vertical Rise = 1.257 + 12.027 X Sin(20.458) = 5.461"

Now to measure the vertical rise, the wing center section's leading and trailing edges were firmly weighted down to the work table with two square steel blocks as shown

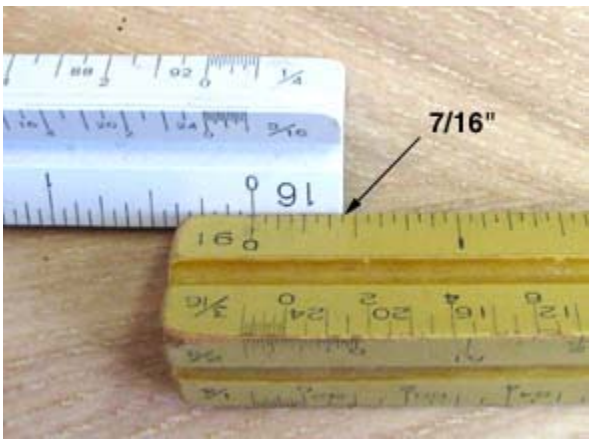
below. Then a triangular scale also shown below was used to measure the wing tip vertical rise off of the work table.



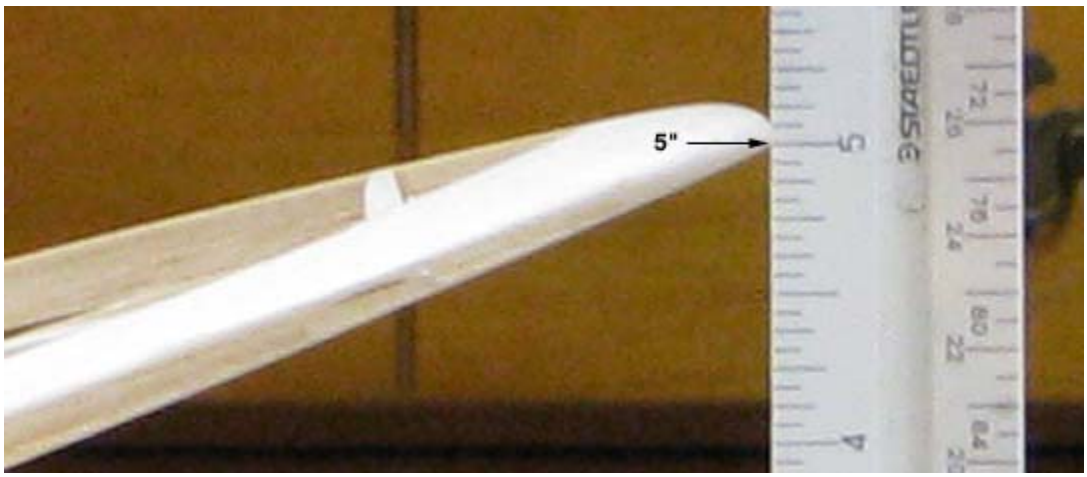
The vertical rise measurement of the lower edge of the left wing tip off the work table, as viewed from the front leading edge, is 4-15/16" as seen below.



This however is not the true measurement because there is a 7/16" (0.438") blank section at the end of the scale as shown below. The true measurement is (4.938+0.438) = 5.376". Therefore, left wing tip rise is slightly under the design value by 5.376-5.461 = -0.085", which is only a 1.6% overall error.



The vertical rise measurement of the lower edge of the right wing tip off the work table, as viewed from the trailing leading edge, is 5" as seen below, which is 5+0.438 = 5.438". The right wing tip rise is slightly under the design value by 5.438-5.461 = -0.023", which is only a 0.4% overall error.



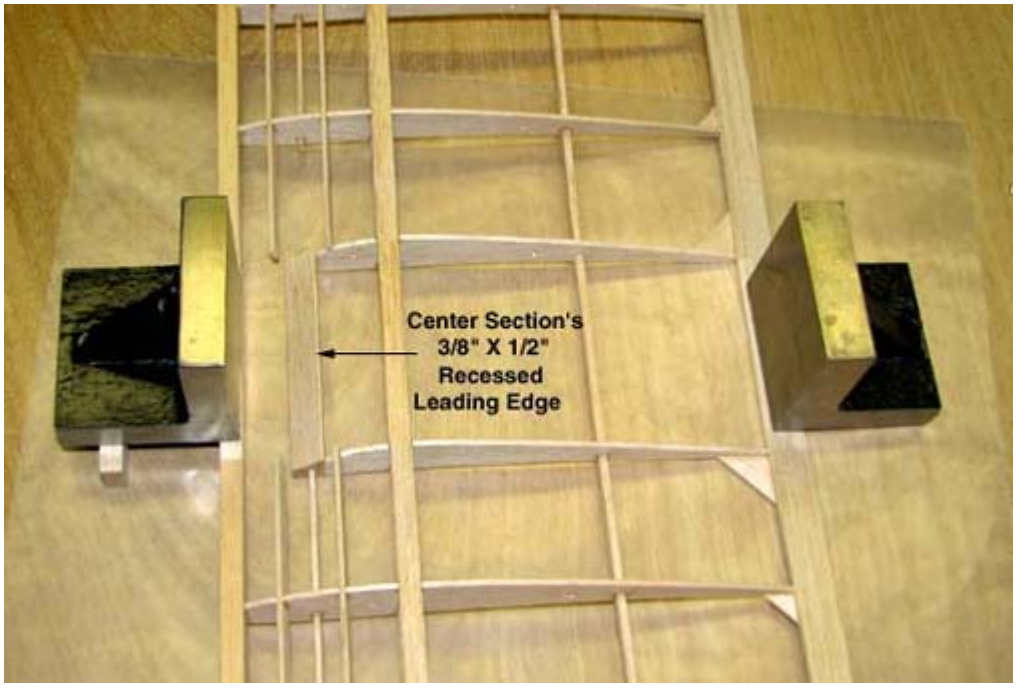
These errors are well within practical building tolerances for balsa. I am pleased and probably very lucky that these errors turned out to be so small.....Tandy

David Harding

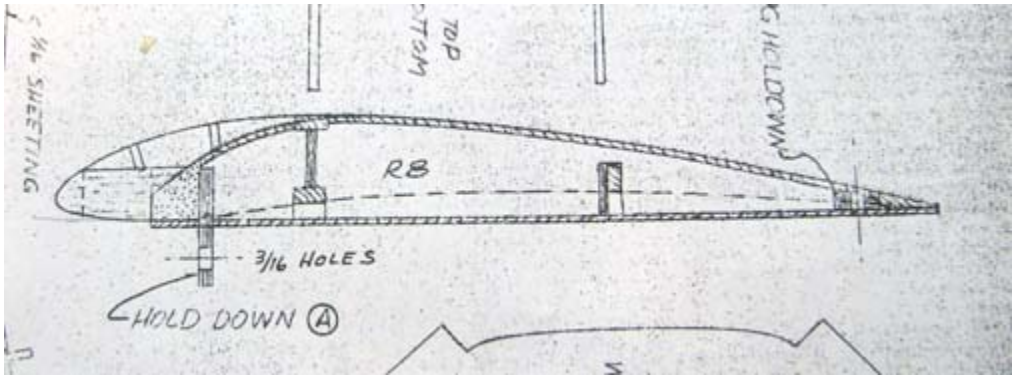
From: Tandy Walker [tandyw@flash.net]
Sent: Tuesday, January 12, 2010 6:01 PM
To: Undisclosed-Recipient: ;@smtp108.sbc.mail.mud.yahoo.com
Subject: 44 Speed 400 Cloudster - Construction of Wing's Recessed Leading Edge (Part 1)

Speed 400 Cloudster Project

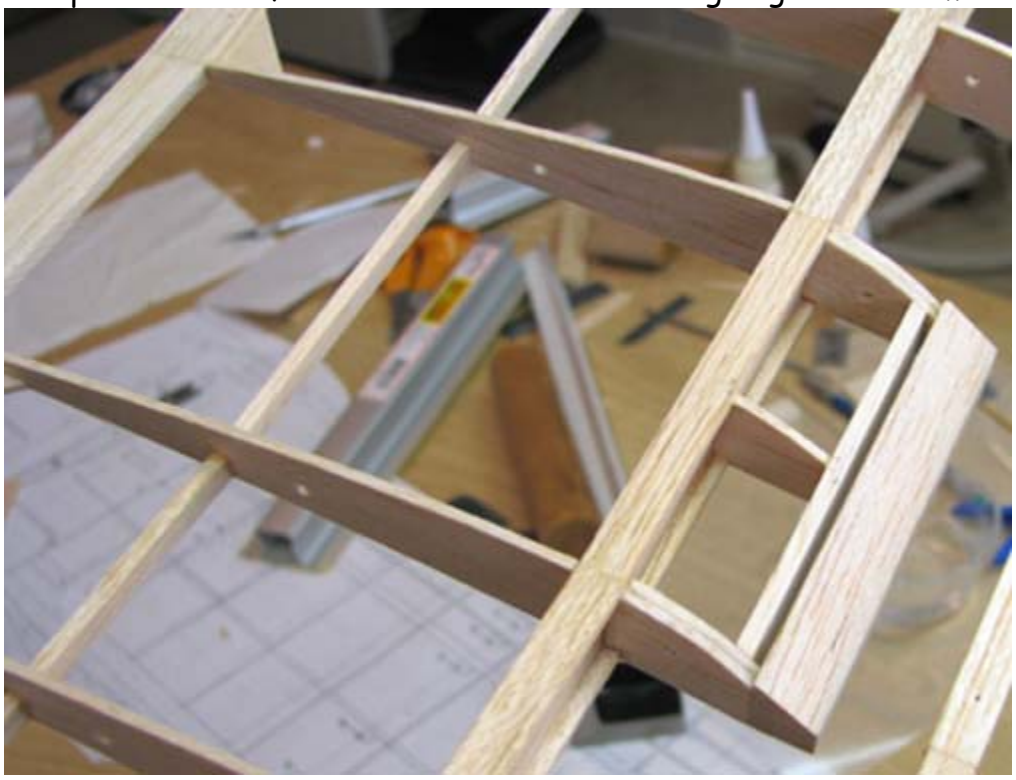
The first step in creating the wing's recessed leading edge is to make the center section's portion of the leading edge out of 3/8" X 1/2" balsa stock. The forward portion of the 1/2" height is beveled down so that the front face is only 1/4" high. Next the forward portion of the two R1 center section ribs are trimmed down and then the leading edge is glued in place as shown below. To make sure the bottom face of the leading edge lies in the same plane as the center section's temporary leading and trailing edges, the wing center section's temporary leading and permanent trailing edges were firmly weighted down to the work table with two square steel blocks as shown below.



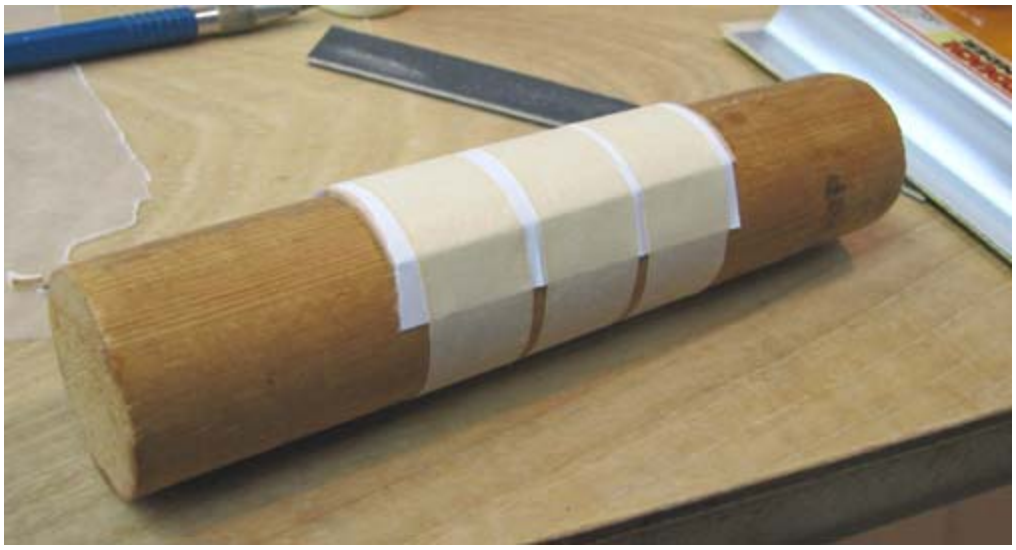
This excerpt from the Jim Adams Cloudster plan details the wing center section showing the forward plywood plate that extends down below the bottom of the center section for the forward wing attachment to the fuselage.



The picture below shows the center section structure that was added forward of the main spar. It consist of three 1/16" balsa sub ribs and a 3/32" balsa back plate with a beveled top behind the leading edge to form the slot for the 1/16" plywood plate. Notice the rather sharp curvature of the ribs between the leading edge and the main spar.

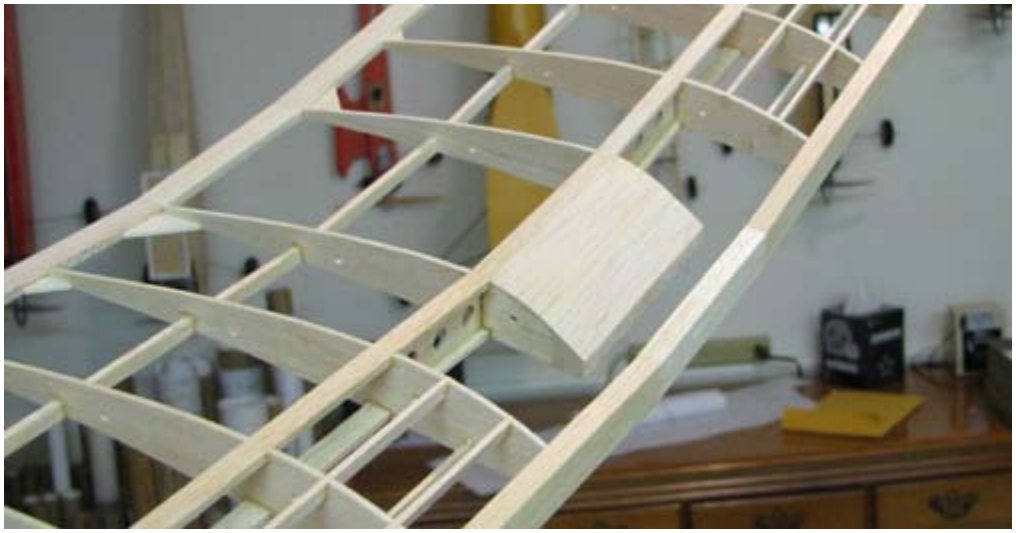


To accommodate this curvature, a piece of 1/16" balsa sheet was wetted and taped around a 1-3/8" wooden dowel to pre-form the curvature as shown below.

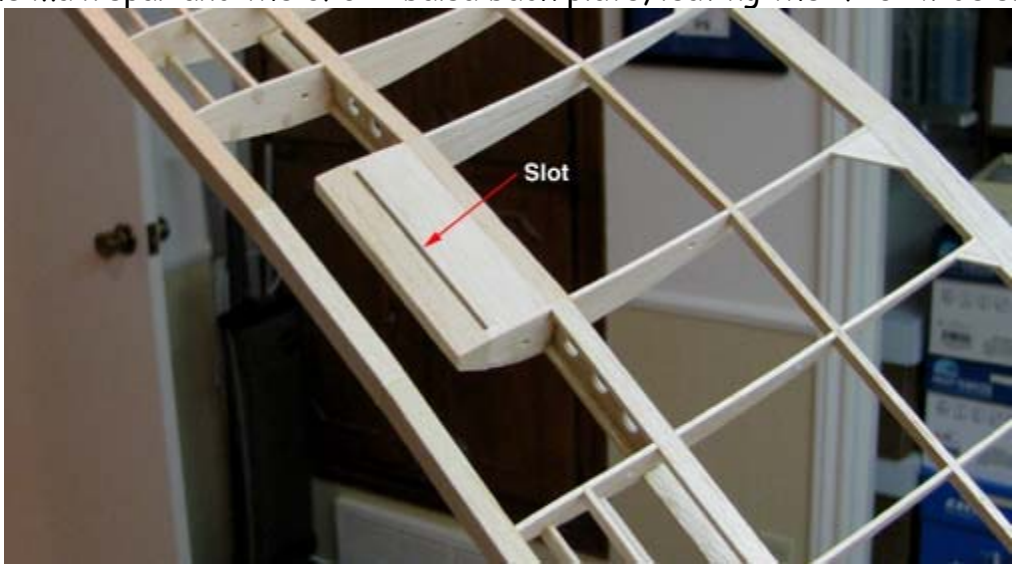


Once dry, the tape was removed and the resulting preformed 1/16" sheet is shown in the picture below.

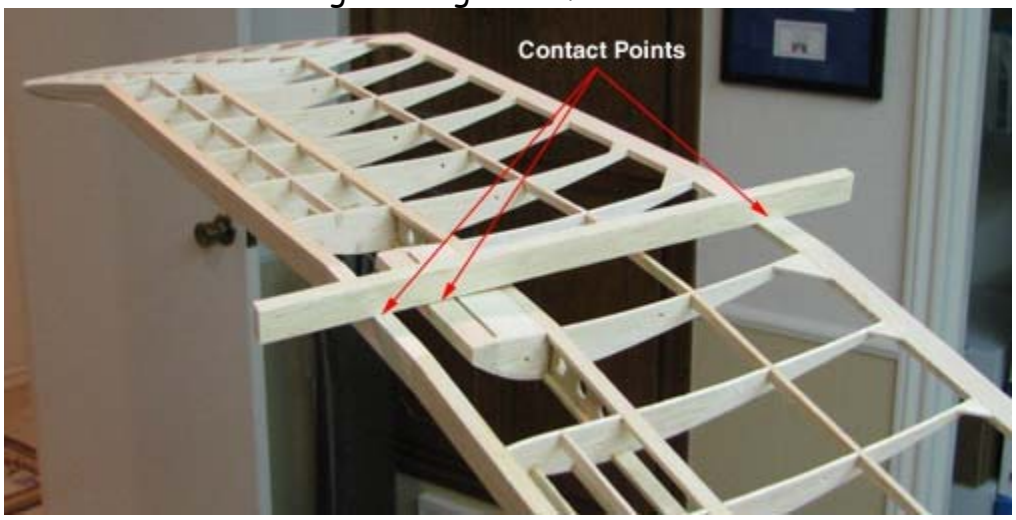
The pre-forming step makes it much easier then to glue the 1/16" balsa sheeting to the top of the forward center section structure as shown below.



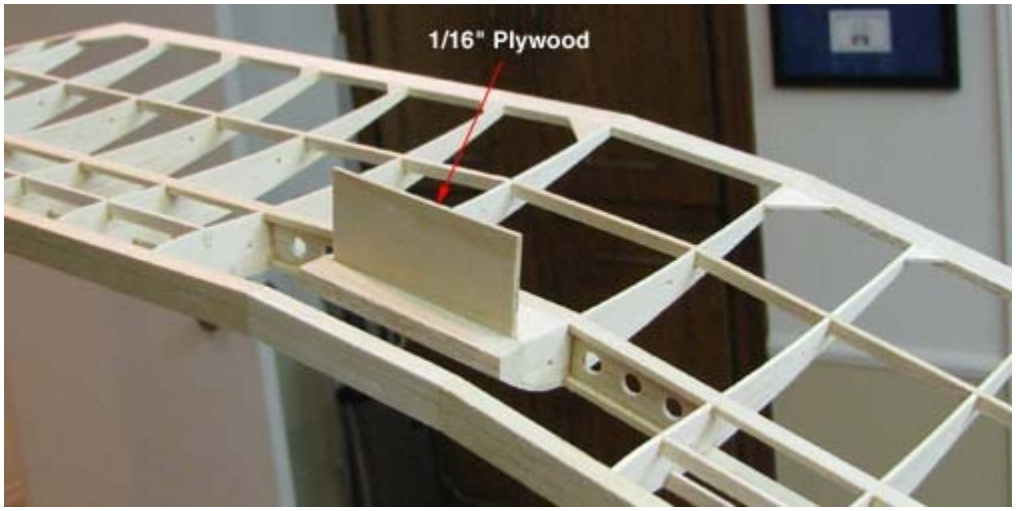
Slightly curved 1/16" balsa sheeting was also glued to the bottom of the center section between the main spar and the 3/32" balsa back plate, leaving the 1/16" wide slot open.



The temporary leading edge and permanent trailing edge have served well as a jig to accurately position the center section's permanent leading edge. In the picture below, you can see that all three lie along a straight line.



In the picture below, a piece of 1/16" plywood has been slipped into the slot for a test fit. After the wing is finished and covered, the finished wing attachment plywood plate will be glued in place.



Tomorrow the two curved portions of the recessed leading edge will be cut out and glued in place. Then the temporary leading can be removed leaving the sculptured recessed leading edge.....Tandy

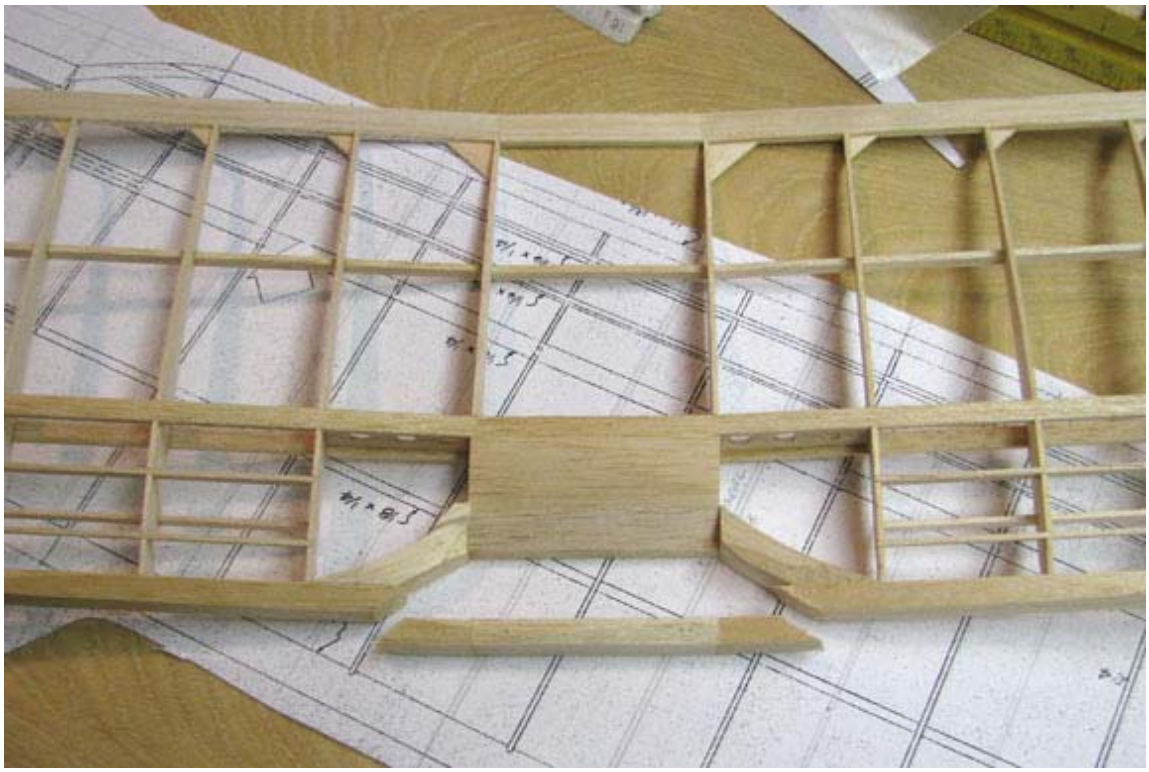
David Harding

From: Tandy Walker [tandyw@flash.net]
Sent: Thursday, January 14, 2010 3:28 PM
To: Undisclosed-Recipient: ;@smtp106.sbc.mail.mud.yahoo.com
Subject: 45 Speed 400 Cloudster - Construction of Wing's Recessed Leading Edge (Part 2)

Speed 400 Cloudster Project

The next step in completing the recessed leading edge is to make the two curved portions of the leading edge and glued them in place as shown below. This now has the center section recessed leading edge firmly tied into the temporary leading edge, which can now be removed. Notice that the inside curvature of these two pieces is finished, but a fair amount of trimming and sanding has yet to be done to shape the outside curvature of the recessed leading edge.

Using an X-Acto razor saw, the temporary leading edge was cut away and separated from the primary wing structure as shown below. It has served its purpose well to hold the wing structure true and accurate until the recessed leading edge could be built.



I have spent most of the day today carefully trimming, sanding, and shaping the difficult curved portions of the recessed leading edge. The top view of the recessed leading edge is shown below.

The bottom view of the recessed leading edge is shown below. A considerable amount of time was spent making the two curved pieces that form the recessed leading edge symmetrical. The curvature of the left side was finished first. Then a paper template was made and traced onto the bottom of the right side, which was most helpful in getting the

two curvatures the same.

This shows the finished recessed sculptured leading edge. Notice the three turbulator spar extensions and the way they tie into the center section's recessed leading edge. Also notice that top portion of the 3/8" X 1/2" leading edge has been partially trimmed down along the top, but there is still quite a bit of work before the leading edge is completely shaped.

Work has stopped for the day. The next step will be construct the center section's remaining structure and planking behind the main spar, which will also include the rear wing attachment.

However, this will not get done tomorrow. My grandson (Steve) is coming over tomorrow morning ***(before he returns to Texas A&M on Monday where he is a junior in computer science engineering)*** at 10:00 a.m. to do some "brain surgery" on my computer. :O< He is going to first save and then delete all files in the memory of the two partitioned disk drives. He

will then remove the partition between the two drives so that there will be only one large composite disk drive. Then he restore all of the software with the six recovery CD's and reload all of my files. Thank goodness for smart computer savvy grandsons.....Tandy

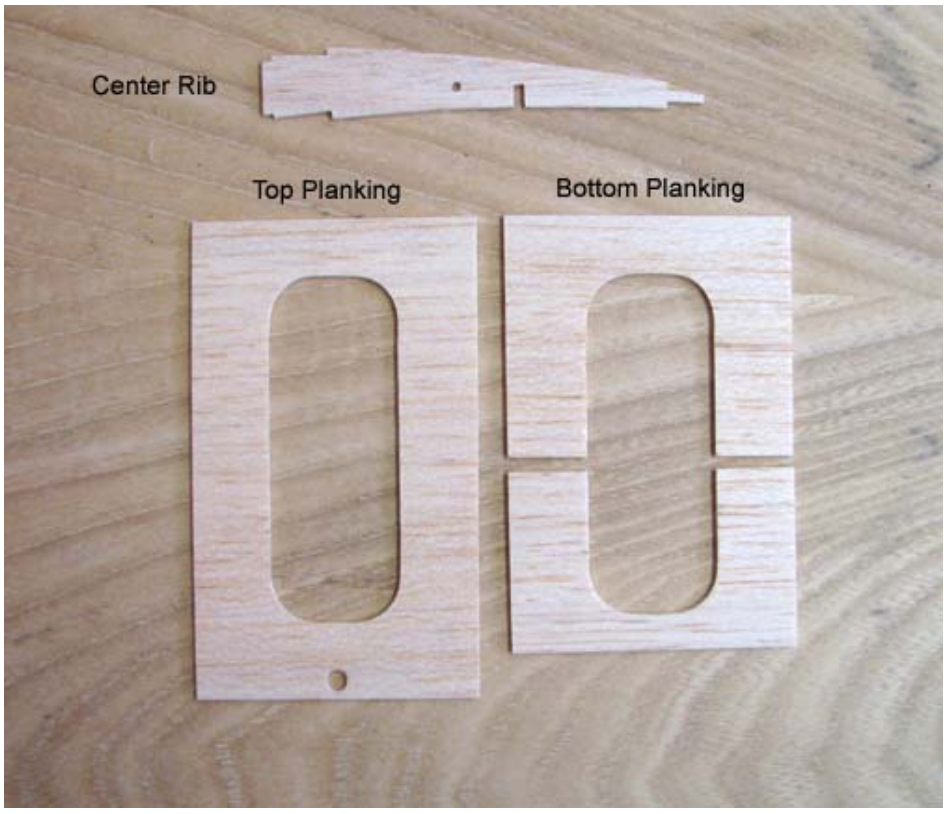
David Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Saturday, January 23, 2010 9:17 PM
To: Undisclosed-Recipient: ;@smtp105.sbc.mail.mud.yahoo.com
Subject: 47 Speed 400 Cloudster - Construction of Wing's Center Section

Speed 400 Cloudster Project

Well, I am up and running again, even though I still have a few computer issues and settings to work out. The reformatting of my computer caused me to loose all of the group folders in the Outlook Express e-mail address book including the Speed 400 group. Therefore, I have had to develop a new Speed 400 e-mail address group folder from memory, which will not have some on the original list.

During all of this down time, I did get some work done on the Cloudster wing's center section. As part of the Cloudster's on going weight saving effort, a significant portion of the center section's top and bottom 1/16" balsa planking was eliminated to save weight as shown below. Also shown is the center rib of the five center section ribs.



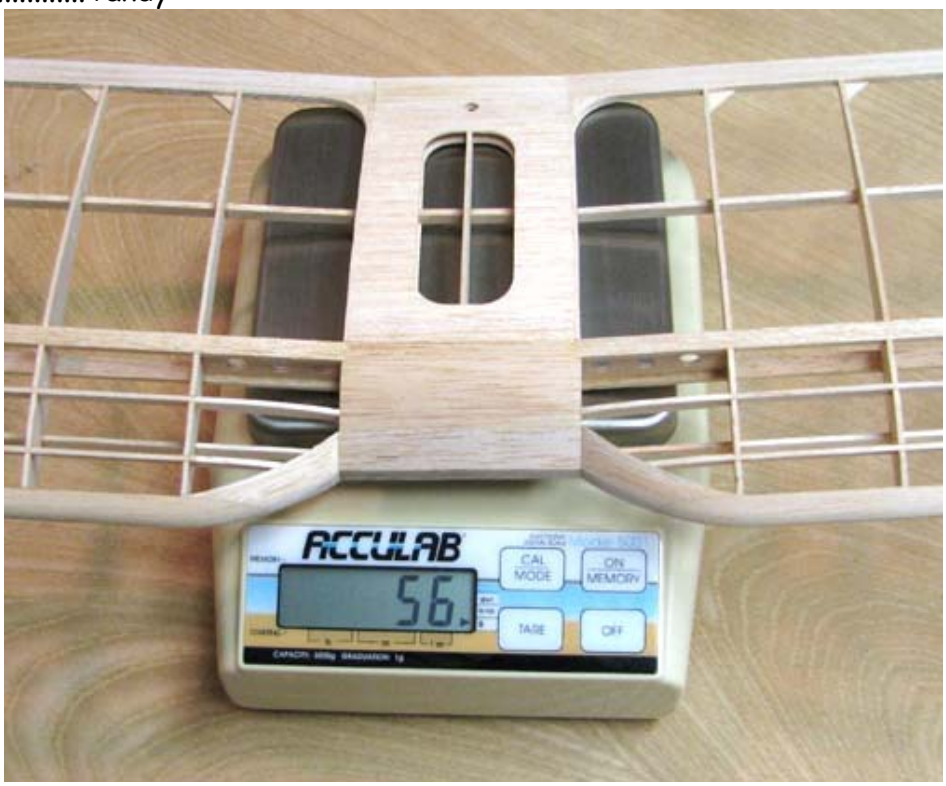
Here you can see the five center section ribs glued in place between the main spar and the trailing edge. You can also see the 1/16" X 1/2" plywood plate attached to the center section's trailing edge with a 2-56 cap screw in the center for the rear attachment of the wing to the fuselage.

This picture shows the center section planking completed.

This is just a shot of the complete wing showing the planked center section.

glued in place.

Since this completes the Cloudster's wing structure, it was weighed and compared to the construction goal of 2 ounces. As shown below, the wing structure weighs 56 grams or 1.98 oz.....Tandy



David Harding

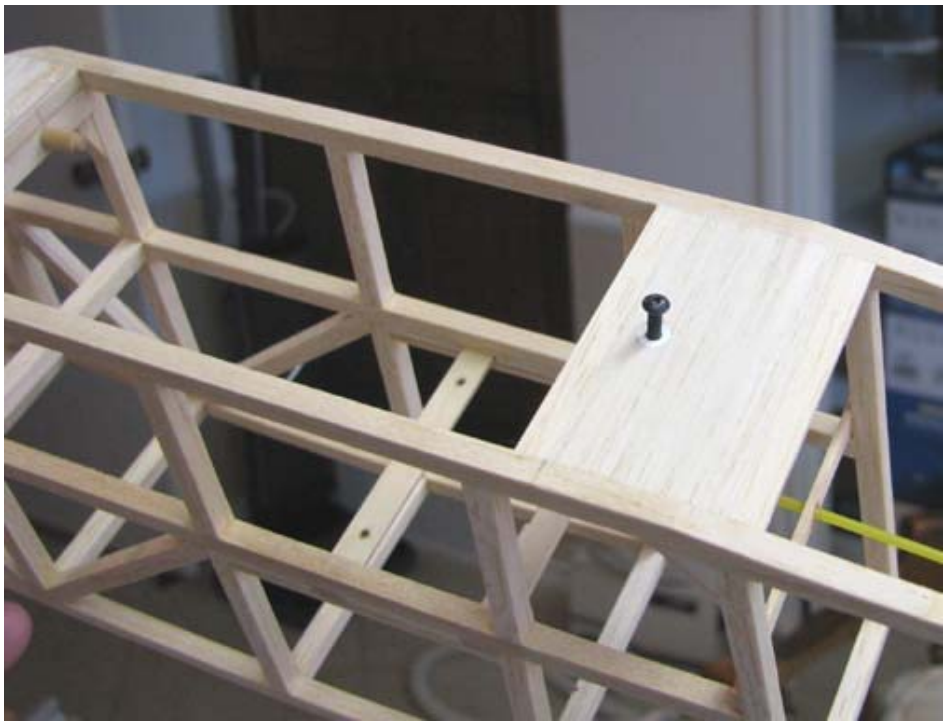
From: Tandy C. Walker [tandyw@flash.net]
Sent: Sunday, January 24, 2010 7:11 PM
To: Undisclosed-Recipient: ;@smtp102.sbc.mail.mud.yahoo.com
Subject: 48 Speed 400 Cloudster -Wing Attachment to the Fuselage

Speed 400 Cloudster Project

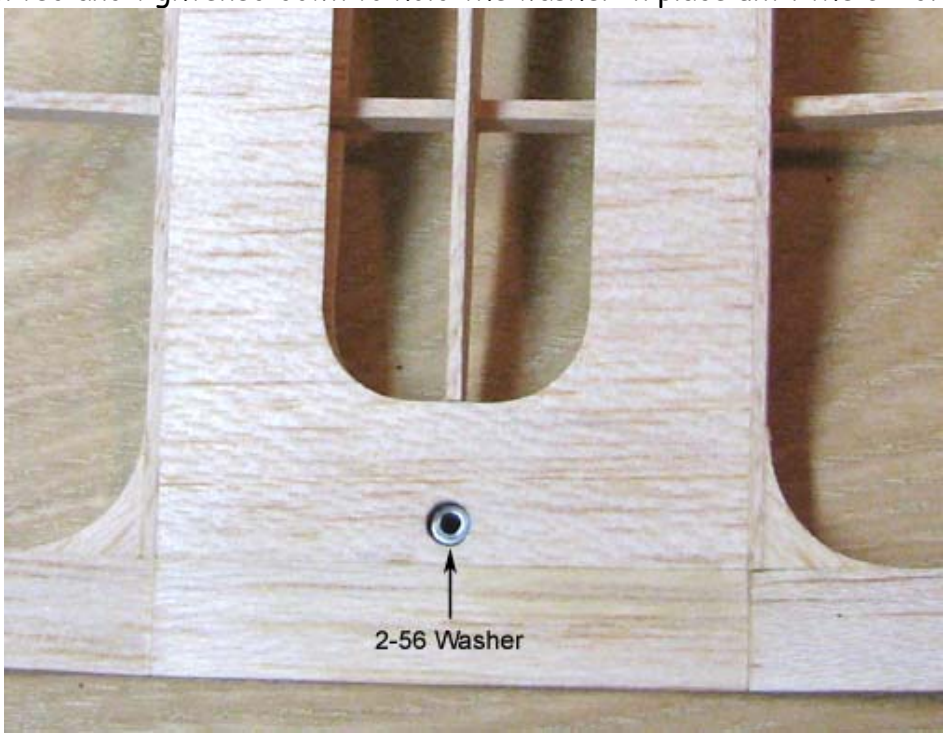
In order to interface the wing's forward hold down plate with the fuselage, second 1/16" plywood plate was made and two 3/16" holes were drilled for the two dowels that slide into the hold down plate. As shown below, this was glued into the top of the fuselage primary structure. The two 3/16" dowels have been cut to length, shaped, and slipped into the holes, but not yet glued in. Notice the two dowels are rounded on the ends. As a side note, since there is no front adjustment to pull the wing down tight against the fuselage structure, a good close tolerance fit of much be achieved.

This picture shows the forward portion of the two dowels cut off at an angle as per the plans.

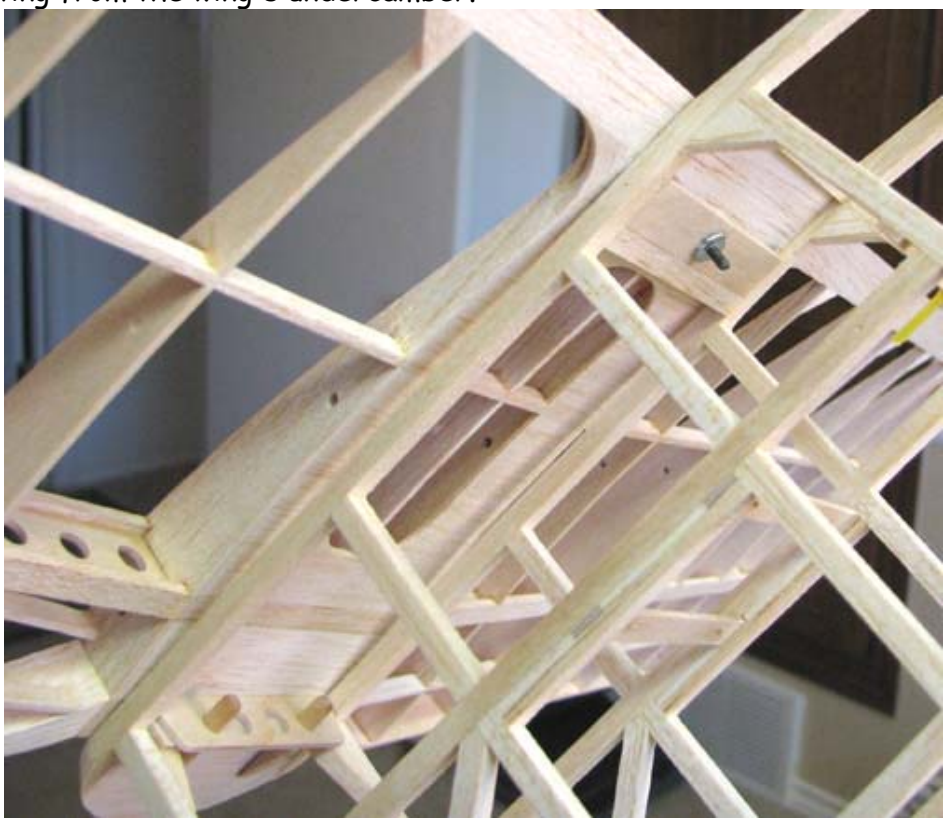
Here you can see the 2-56 cap screw threaded into a blind nut embedded in a strip of 1/16" plywood underneath the 1/8" balsa. If you look close, you can see that a piece of white ABS plastic tubing lines the hole to serves as a grommet to protect the edge of the hole around the balsa.



In order to protect the edges of the hole in the wing's plywood rear attachment, a small amount of medium CA was carefully applied around the hole in the plywood, a small 2-56 washer was slipped through the top planking and placed down onto the plywood as shown below. A 2-56 cap screw was inserted and tightened down to hold the washer in place until the CA dried.

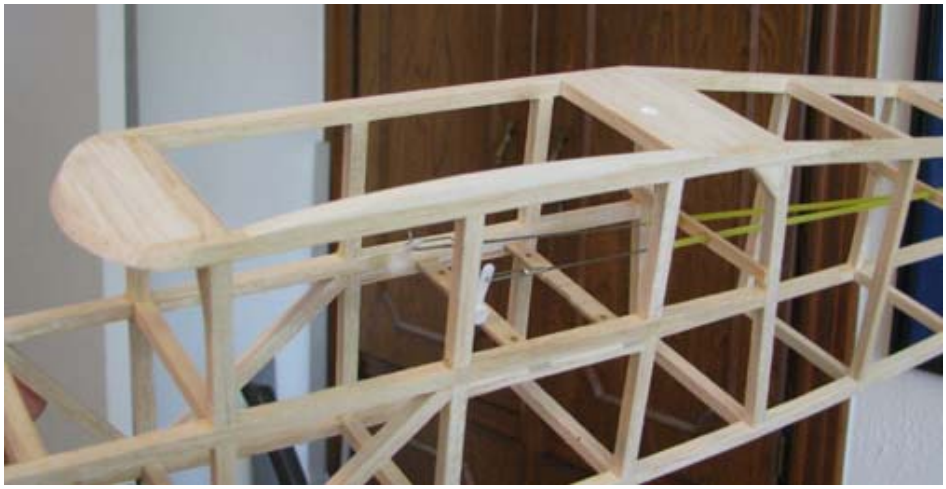


This is a view from underneath showing the two dowels engaged in the front hold down plate and the 2-56 cap screw threaded into the blind nut. Notice the curved gapped opening over the top longeron resulting from the wing's undercamber.



A piece of 3/16" balsa was cut out and carefully sanded to shape as shown below to form the wing saddle that will fit into the opening and interface with the wing's bottom planking.

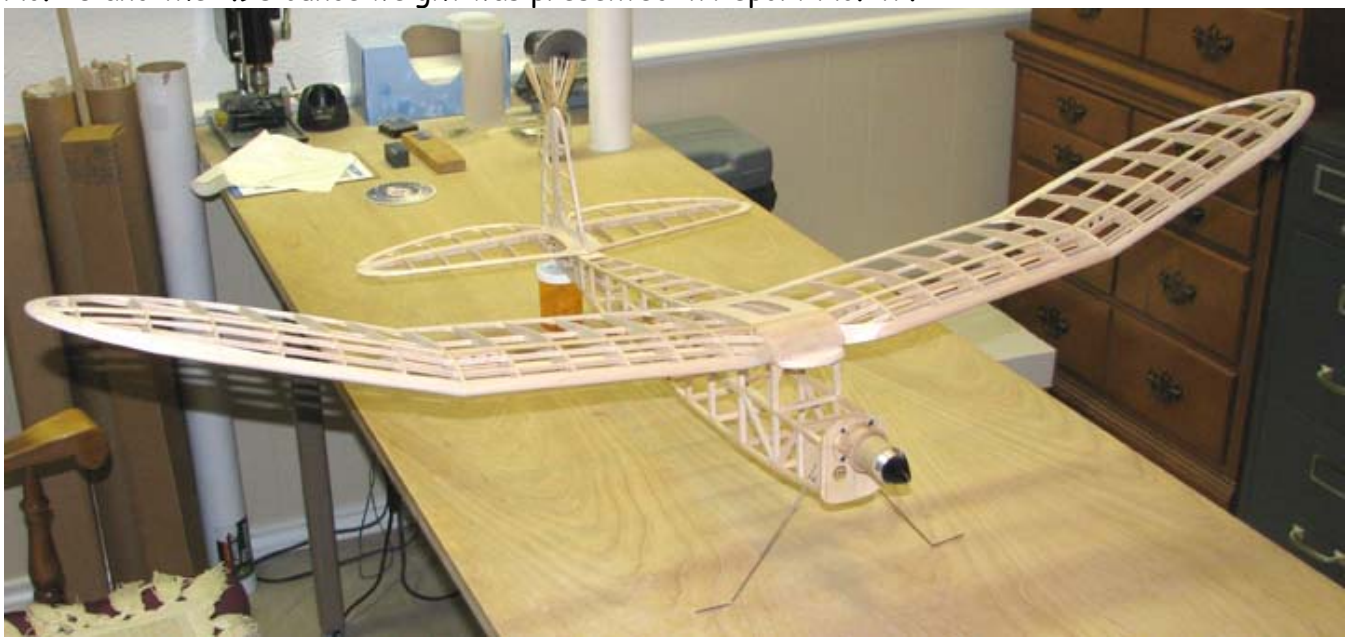
This shows the wing saddle piece glued to the left top longeron under the wing.



At this point, a problem was realized! You see in order to remove the wing, it must be slid back 5/16" to disengage the hold down plate from the two dowel. However, the wing will ramp up as it starts to slide back along the wing saddle and the hold down plate will instantly bind on the two dowels! Fortunately, the two dowels had not been glued in place so they could still be removed. New shorter dowel were made with almost flat ends as shown below.

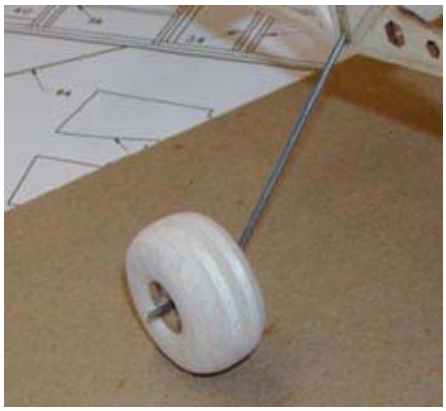
In this view under the wing, you can see that the new dowels only extend through the wing's hold down plate 1/16", which allows the hold down plate to cleanly disengage with only a slight aft movement in the wing while also rotating the wing trailing edge up slightly. Several trial wing attachments and removals proved this to be quite satisfactory.

This shows the current Cloudster's structure from a frontal view. Total weight at this stage of the construction is (6.17+1.98) = 8.15 ounces, just slightly over half of the 16 ounce minimum weight requirement for the Speed 400 event. The 6.17 ounce weight was presented in Report No. 25 and the 1.98 ounce weight was presented in Report No. 47.



This shows another view of the Cloudster's structure from the rear.

The wing and tail assembly should be covered next so that the location of the rather heavy Li-Po battery can be determined that will balance the model. However, I still have to decide what the color scheme will be and what covering material to use, which I will probably have to be ordered. In the mean time, the tail skid can be made and installed and the fuselage's bottom bulkheads can be cut out. I also need to get a set of the lightest 2-1/8" wheels I can find. There are some of these curved spoked spider looking wheels for electric models that weigh almost nothing, but they look simply terrible in my opinion. I may have to resort to making some light balsa wheels myself like the one shown below that I made for the little rubber powered Cub I built. Do you know of some light weight 2" to 2-1/8" wheels?.....Tandy



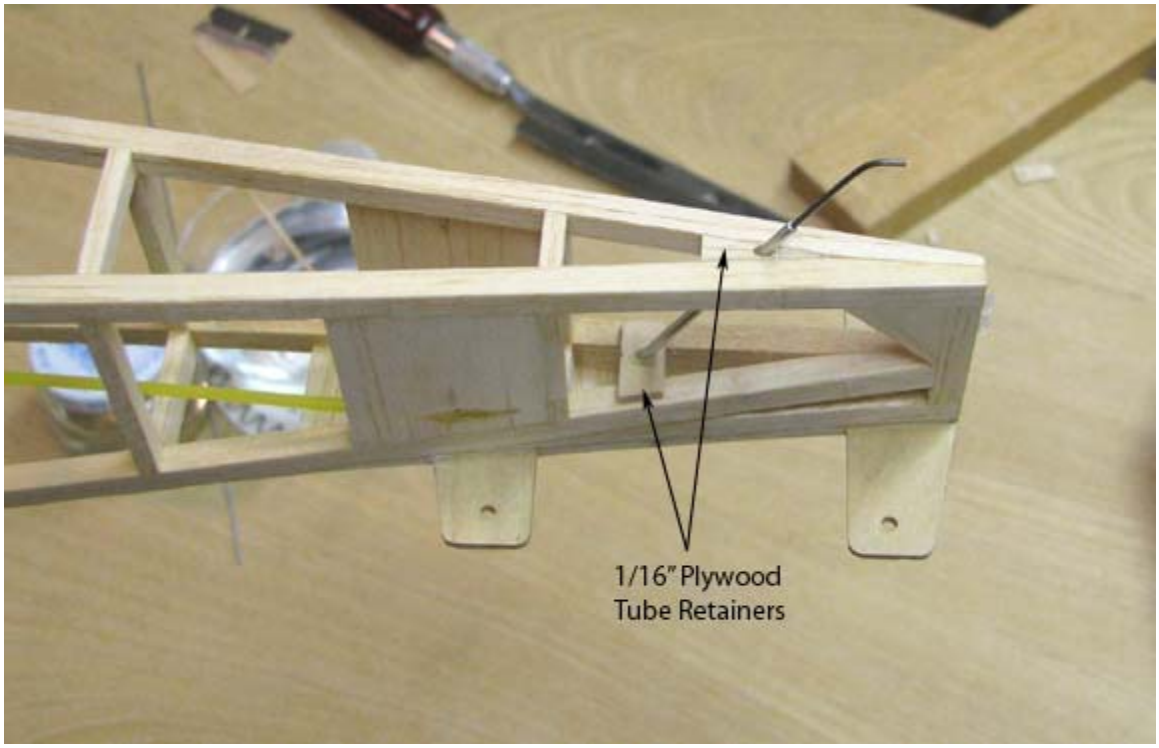
David Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Monday, January 25, 2010 3:00 PM
To: Undisclosed-Recipient: ;@smtp107.sbc.mail.mud.yahoo.com
Subject: 49 Speed 400 Cloudster - Tail Skid

Speed 400 Cloudster Project

Some time was spent with Jerry Kestner here today while he resolved most of the remaining issues on my computer that have cropped up since he did the restoration and reformatting of the hard drive. There was not to much progress on the Cloudster today except for the tail skid installation and some initial concept work on how to go about building the cowl. However, I will go on and post the work on the tail skid.

The tube for securing the 1/32" wire tail skid was cut from a piece of 1/16" aluminum tubing with a 1/32" I.D. This tube was installed in the rear of the fuselage structure using two 1/16" plywood retainers, which were glued into the structure as shown below. The plywood retainer at the bottom of the picture also has a small second piece of 1/16" plywood glued on the bottom to prevent the aluminum tube from going all of the way through. The aluminum tube itself was cleaned with Acetone and CA'd to the two plywood retainers. The aluminum tube was left protruding out the bottom about a 1/4". Once the bottom bulkheads and stringers have been installed, this tube will be cut off flush with the stringer line. A piece of 1/32" piano was bent on the lower end to form the tail skid and inserted into the aluminum tube as shown below. However, it will not be epoxied inside the tube until the fuselage has been finished and covered.

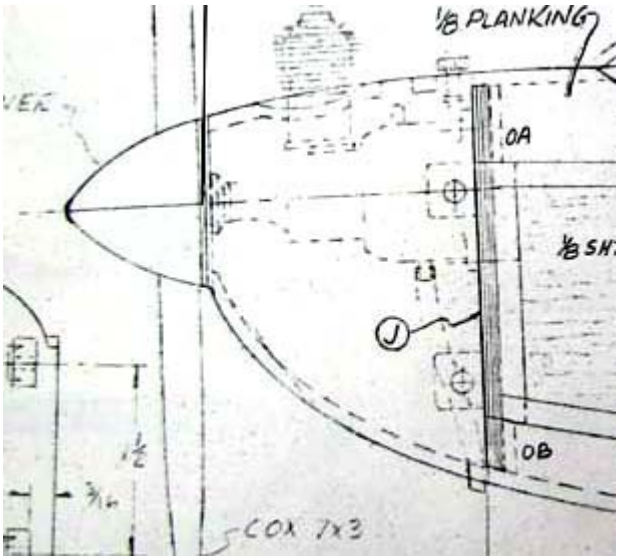

1/16" Plywood
Tube Retainers

David Harding

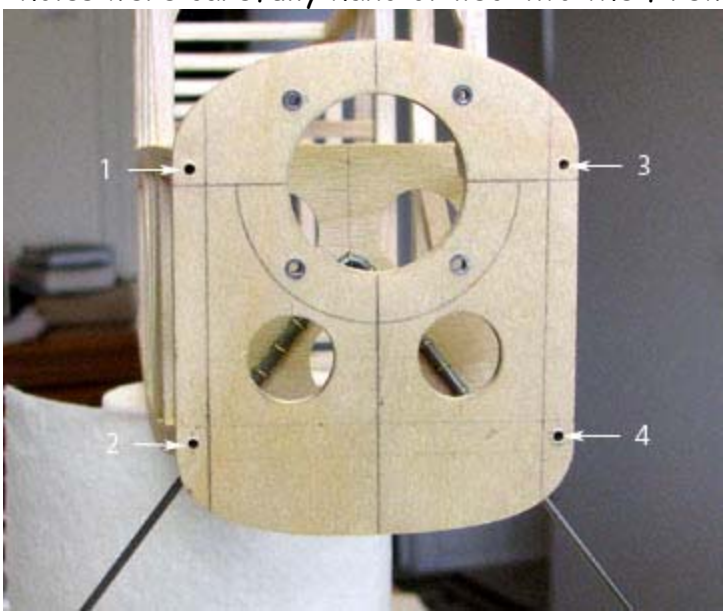
From: Tandy C. Walker [tandyw@flash.net]
Sent: Wednesday, January 27, 2010 5:08 PM
To: Undisclosed-Recipient: ;@smtp103.sbc.mail.mud.yahoo.com
Subject: 50 Speed 400 Cloudster - Construction the Cloudster's Cowl Frame

Speed 400 Cloudster Project

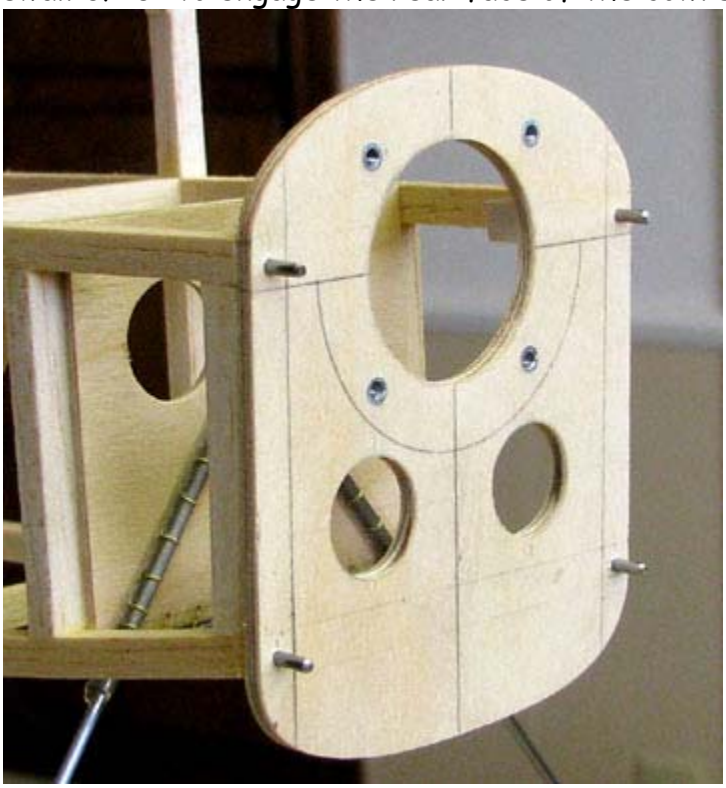
The Jim Adams plan has a sculptured cowl that fairs into the back of a spinner as shown below.



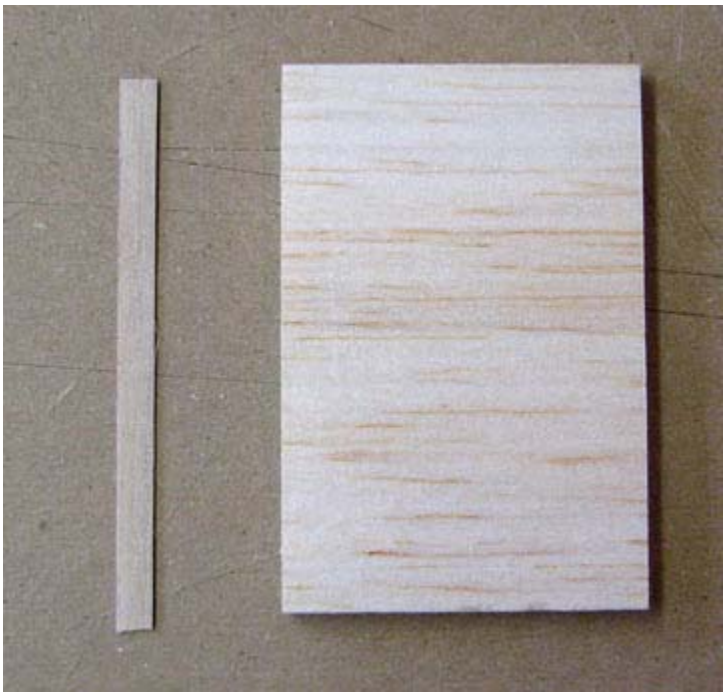
After several concept considerations for constructing a cowl, an approach finally immerged. Four 1/16" holes were carefully hand drilled into the firewall as shown below.



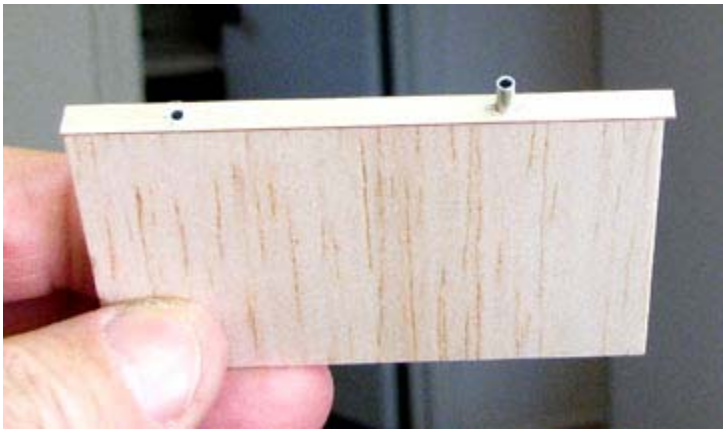
Four 7/16" lengths of 1/16" piano wire were cut and inserted into the holes in the firewall. The length of these cowl alignment pins allow the pins to protrude out of the front face of the firewall 3/16" to engage the rear face of the cowl sides.



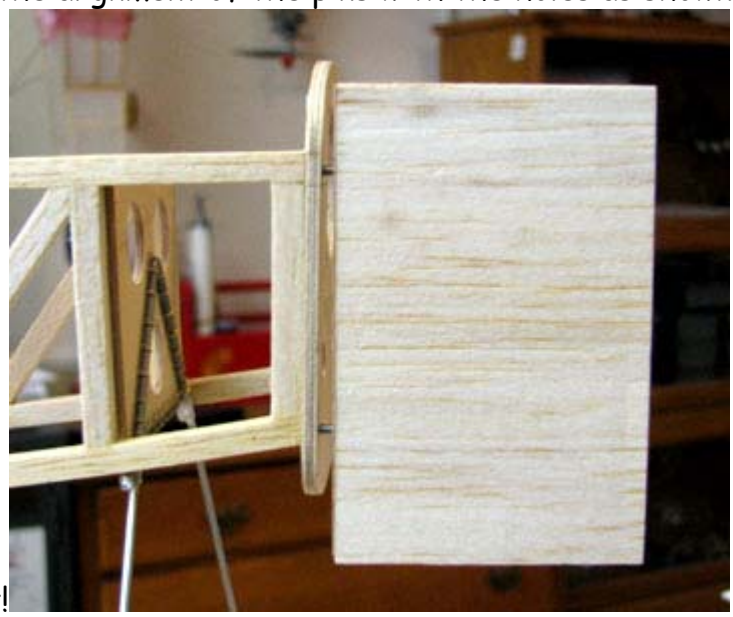
Next, a 3" wide sheet of 3/16" medium soft balsa sheet was cut to length for the cowl side shown below. A 3/16" wide strip was cut from 1/64" plywood, which is also shown below.



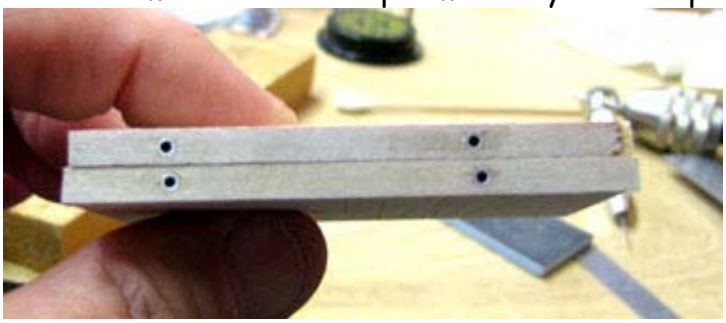
The strip of plywood was glued to the rear edge of the 3/16" balsa sheet. This protects the balsa edges from getting all dented up. The two holes were marked to align with the cowl pins and then drilled 3/8" deep. An aluminum tube with 1/16" I.D. was cut to length and inserted into the hole as shown below.



A trial fit was performed to check the alignment of the pins with the holes as shown below. Thank goodness, they did fit!

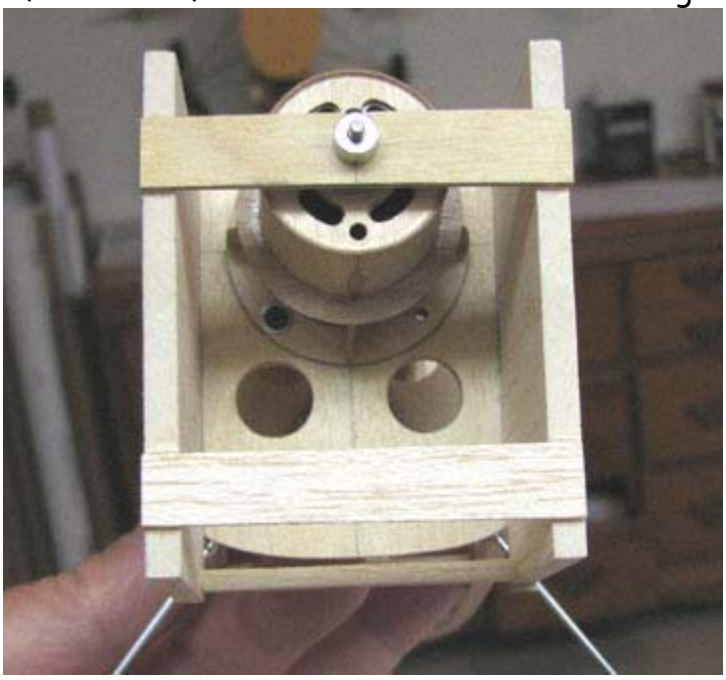


The aluminum tubes were removed and then permanently CA's in place as shown below.



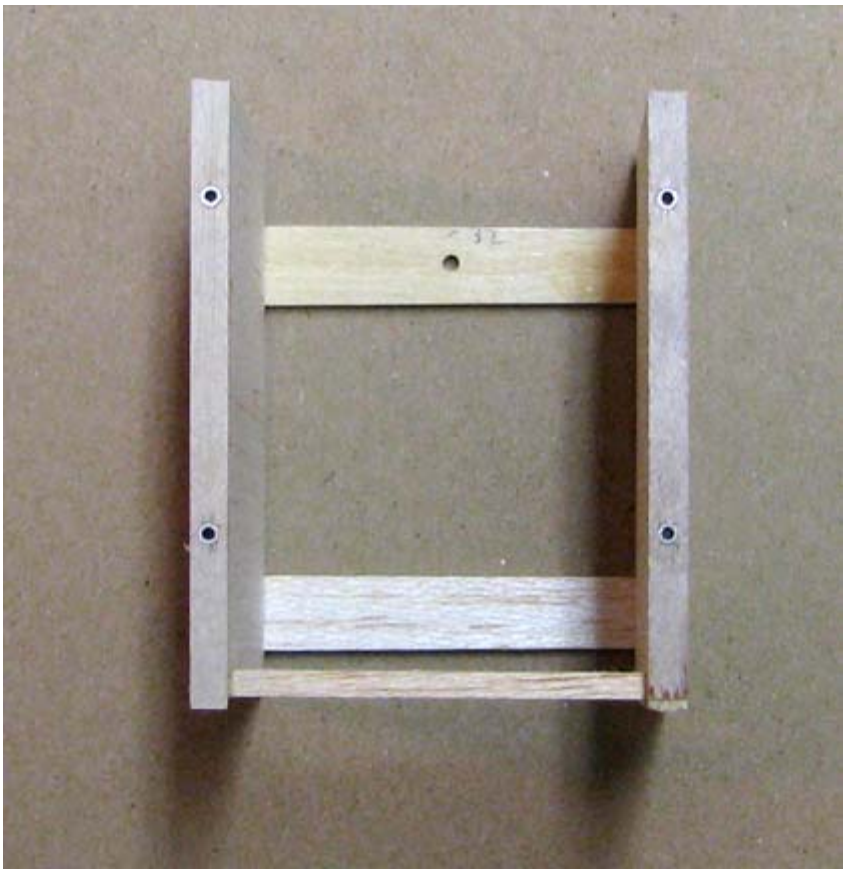
A strip of 1/16" plywood was drilled out for the Speed 400 motor shaft. This plywood

strip was forced down against the front of the cowl sides and held down with a 3/32" wheel collar as shown below. Even though the fuselage sides taper in at the front, the cowl sides were positioned perpendicular to the firewall and CA's to the plywood strip. In addition, as second balsa strip was added on the front of the cowl sides to jig the cowl sides straight. Notice that a balsa brace was also added between the cowl sides on the bottom back near the firewall to further hold the cowl sides straight.



Once dry, the wheel collar was taken off and the cowl frame was removed from the fuselage as shown below.

The cowl frame was turned over and this picture taken to show the four lined holes to receive the four cowl alignment pins. The reason the cowl sides are kept parallel is that any and all balsa rectangular blocks can be easily glued to the inside faces of the cowl sides.



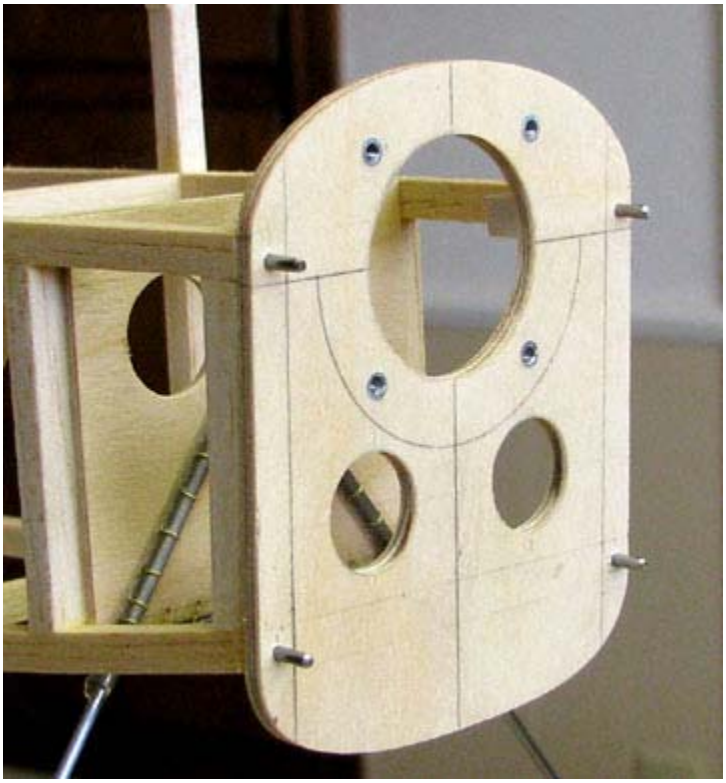
Before the cowl sides are blocked in on top and bottom with balsa and the cowl carved to shape, a method for cowl retention must first be designed. However, that will be the subject of tomorrow's report. Work has stopped for the evening as the President's State of the Union speech is coming on at 8:00 p.m. and will last until 10:00 p.m. and Sue and I want to watch it in its entirety.....Tandy

David Harding

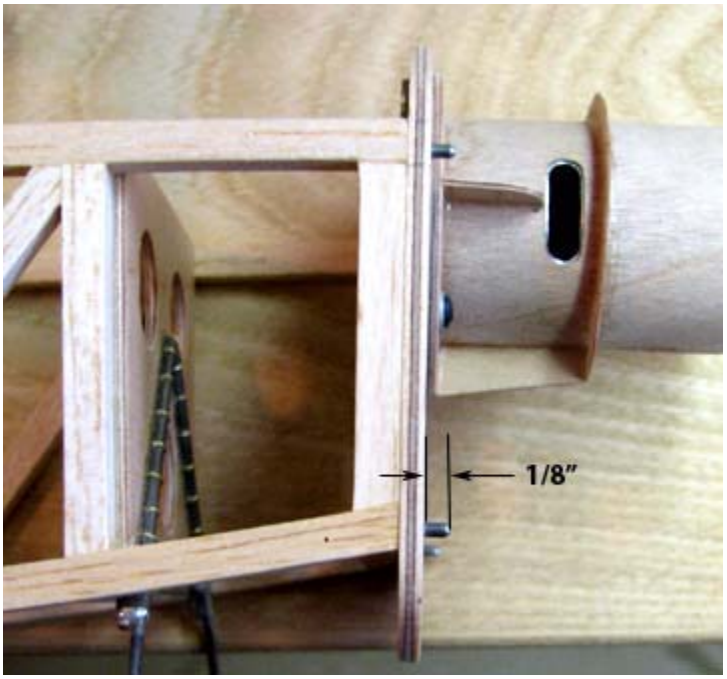
From: Tandy C. Walker [tandyw@flash.net]
Sent: Saturday, January 30, 2010 10:40 AM
To: Undisclosed-Recipient: ;@smtp103.sbc.mail.mud.yahoo.com
Subject: 51 Speed 400 Cloudster - Different approach to the Cowl Frame

Speed 400 Cloudster Project

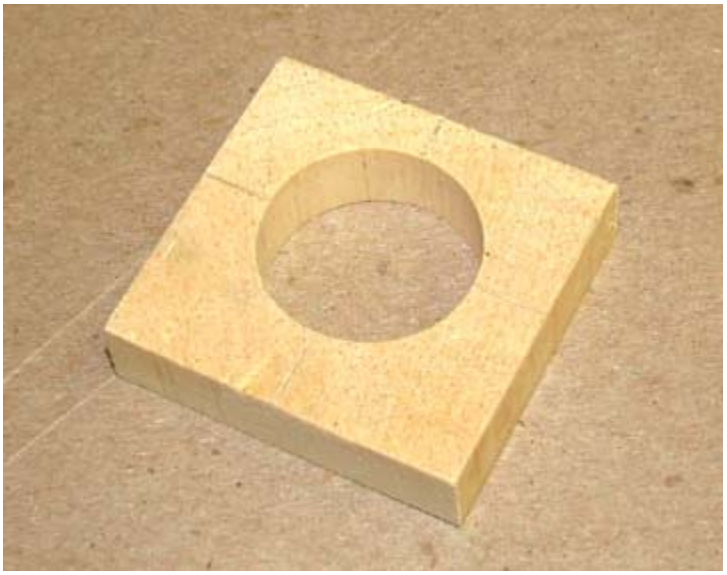
Three mistakes were made on the first cowl frame in Report No. 50: (1) the 7/16" cowl alignment pins shown below were too long, (2) the 3/8" aluminum tube liners for the cowl pins went into the cowl sides too far, (3) the cowl sides were made perpendicular to the firewall instead of parallel to the fuselage sides. Once the cowl was blocked in and carving and trimming of the sides started, the ends of the four embedded aluminum tube liners would quickly be exposed because they extend out too far and are too close to outside surface of the cowl.



To correct this problem, first the cowl alignment pins were shortened to 1/8" as shown below. After all, these pins only need to be long enough to engage the back face of the cowl sides.

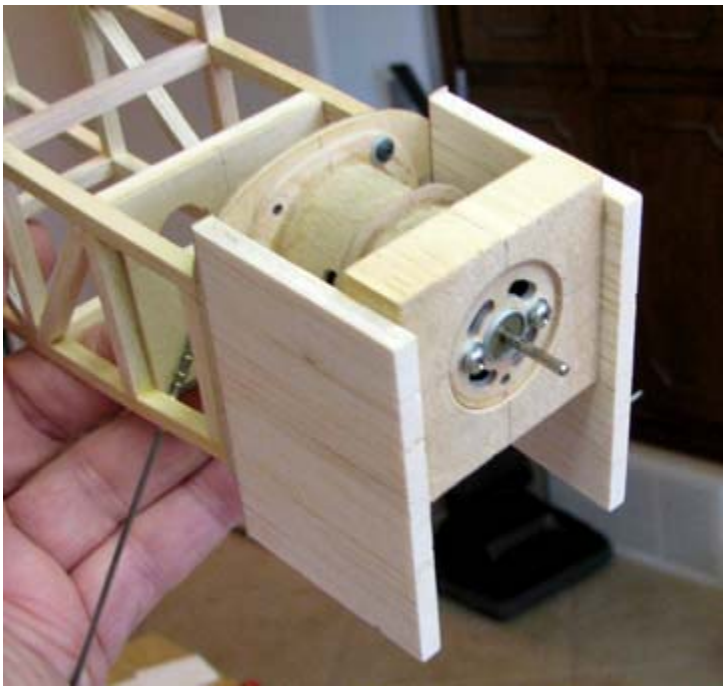


This is where the approach to the cowl frame changes. A 1/2" length of balsa was cut off the end of a 2" X 2" soft balsa block. The front and rear cross grain face were sanded smooth. Then a hole was cut out in the block as shown below and sanded so as to slip snugly over the front end of the cylindrical motor mount. Notice the end grain of this cowl nose block.

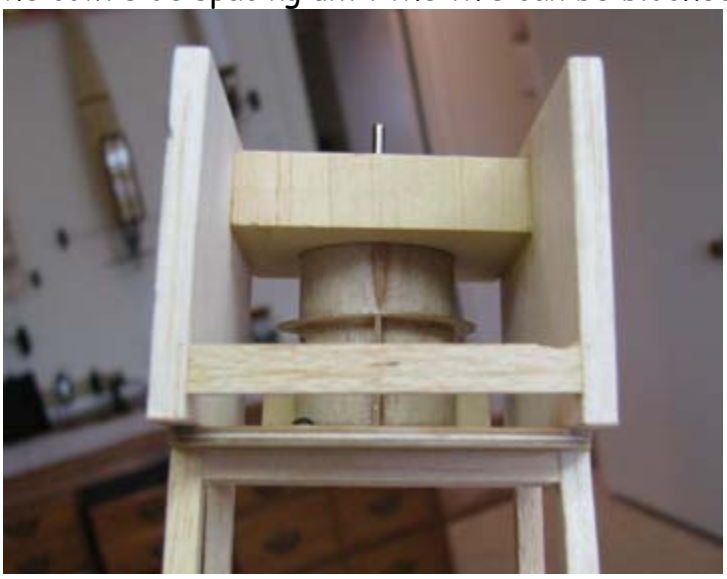


Then two new cowl sides were made using the procedure in Report No. 50, except the rear faces of the sides were beveled so that the cowl sides were parallel with the fuselage sides instead of being perpendicular to the firewall. The vertical side edges of the cowl nose block were carefully trimmed and sanded so that the cowl sides that are parallel with the fuselage sides were also tangent to nose block. Once this was done, the nose block was slipped over the motor tube, the new cowl sides were pushed onto their

respective alignment pins, and the two cowl sides were glued to the nose block with aliphatic glue as shown below. This approach insures an almost perfect alignment fit of the cowl to the firewall.



A temporary balsa brace was also added between the cowl sides on the bottom back near the firewall to hold the cowl side spacing until the this can be blocked in with balsa.



Once this is allowed to thoroughly dry, then balsa will be blocked in between the cowl sides on top and bottom. Oh yes, a method for attaching the cowl has been thought out, but this will be presented and discussed in a later report.....Tandy

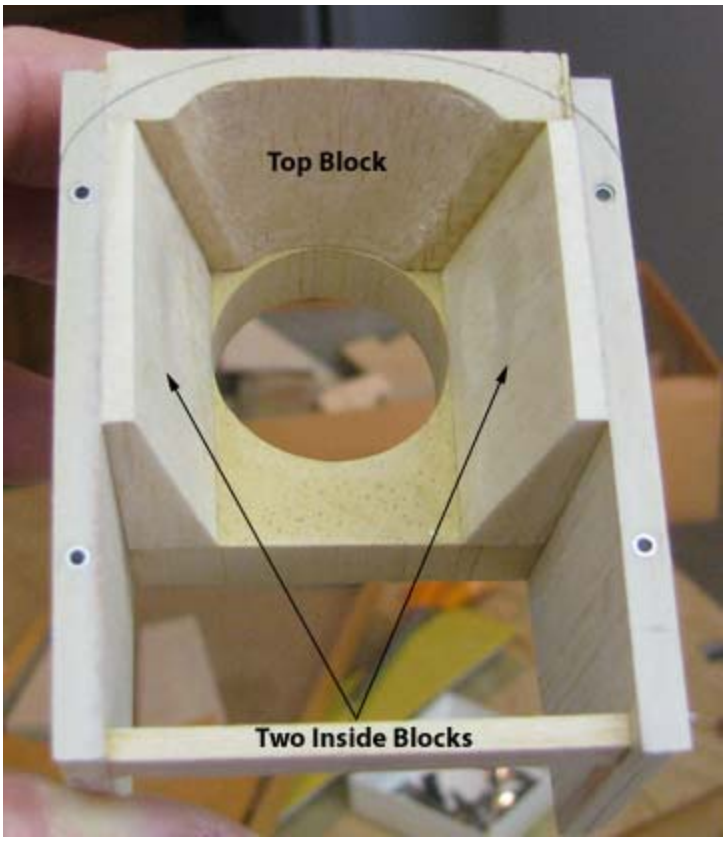
David Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Monday, February 01, 2010 8:55 PM
To: Undisclosed-Recipient: ;@smtp107.sbc.mail.mud.yahoo.com
Subject: 52 Speed 400 Cloudster - Continued Cowl Construction

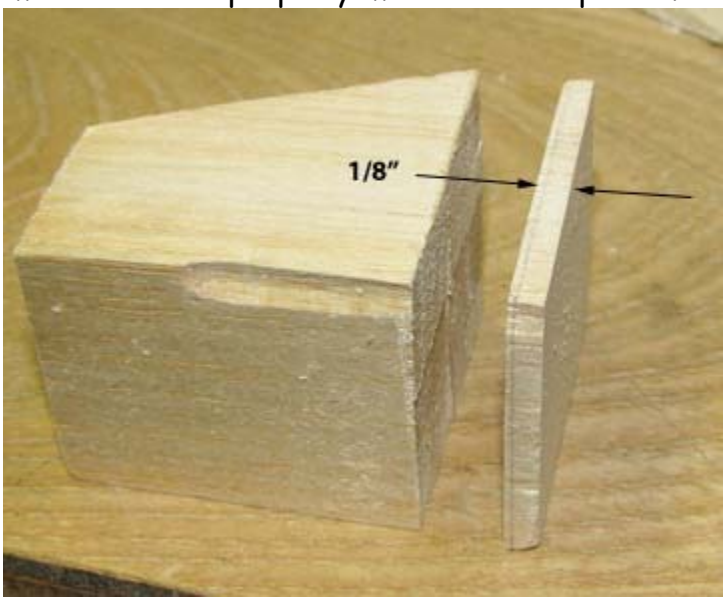
Speed 400 Cloudster Project

The first soft balsa fill in block to be added between the two cowl sides was on top as shown below.

Next two tapered soft balsa blocks were added to the insides of the two cowl sides as shown below. Notice inside carving and relief shaping of the top block.

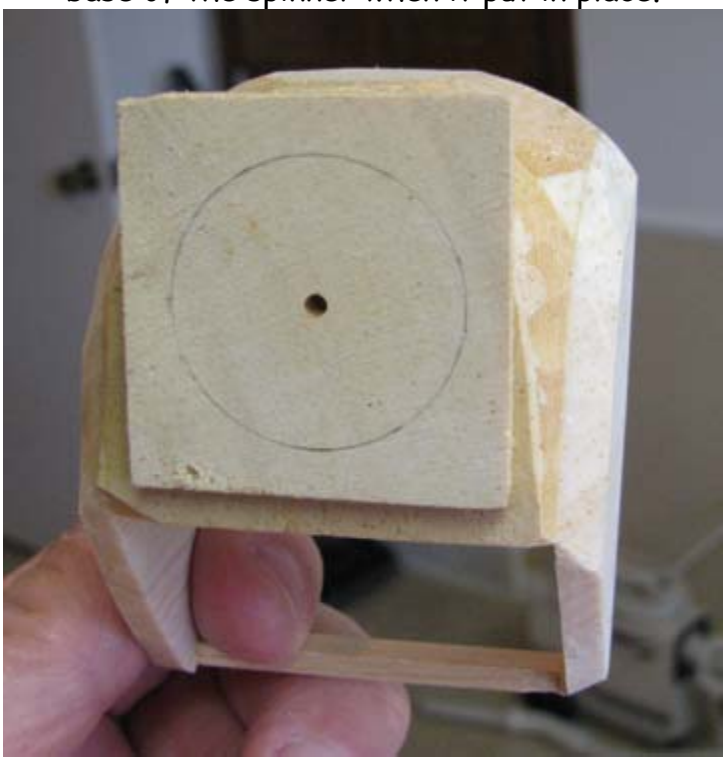


Last night when I checked the location of the rear face of the spinner, pushed all of the way onto the motor shaft, I found that the forward face of the cowl falls short by an 1/8" @#$%! So I cut off an 1/8" ***(plus a little for sanding)*** cross grain wafer to glue to the front of cowl frame in order to properly mat with the spinner.

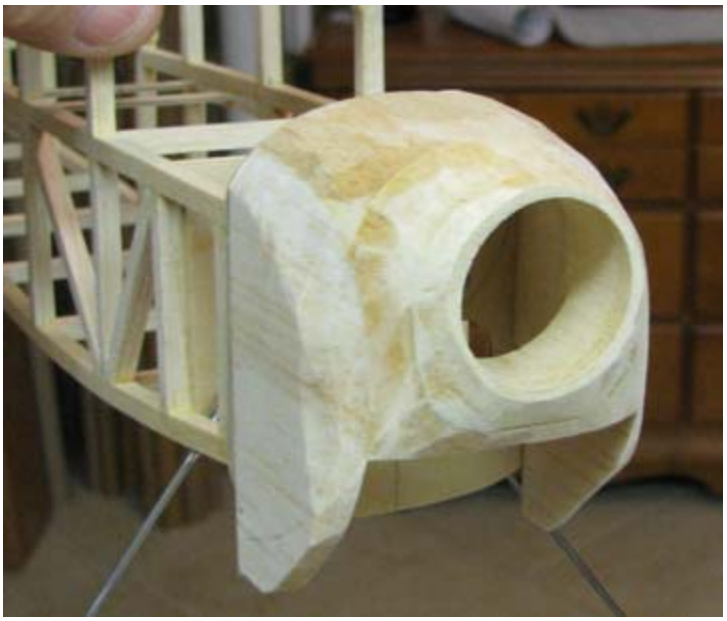


This picture shows the 1/8" cross grain balsa wafer glued to the front of the cowl from the side.

This picture shows the wafer from the front. The penciled circle was drawn around the base of the spinner when it put in place.



Some crud and rough shape carving on the cowl's top front is shown below. Notice that the bottom of the cowl has not been blocked in yet. A central cowl retention screw arrangement has to developed first before blocking it in.



Carving, sanding, and shaping of the cowl can not be continued until the bottom bulkheads and stringers have been added as well as the curved planking on the top of the fuselage right behind the firewall. This is necessary to fair the lines of the cowl into the lines of the fuselage to form the seamless transistion. So for the time being, any further work on shaping the cowl will be discontinued, except for developing the central cowl retention screw arrangement.....Tandy

David Harding

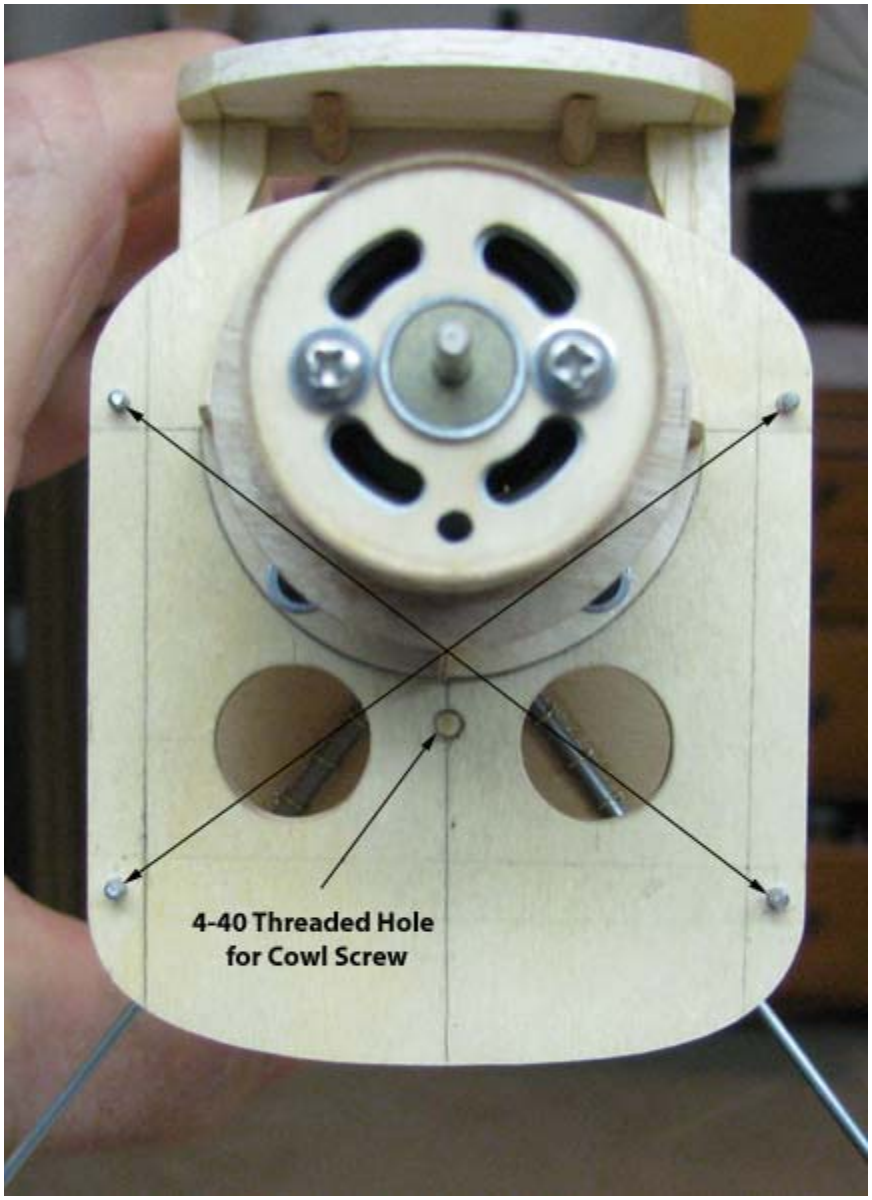
From: Tandy C. Walker [tandyw@flash.net]
Sent: Thursday, February 04, 2010 7:31 PM
To: Undisclosed-Recipient: ;@smtp105.sbc.mail.mud.yahoo.com
Subject: 53a Speed 400 Cloudster - Cowl Retention

Revision A

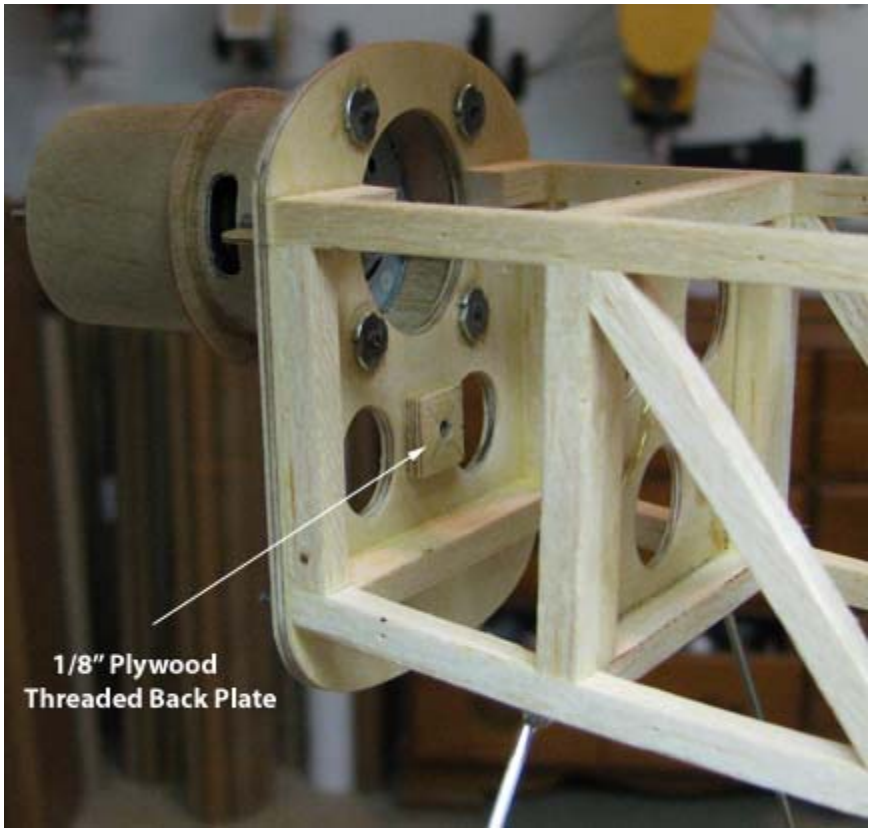
See the narative above the third picture below.

Speed 400 Cloudster Project

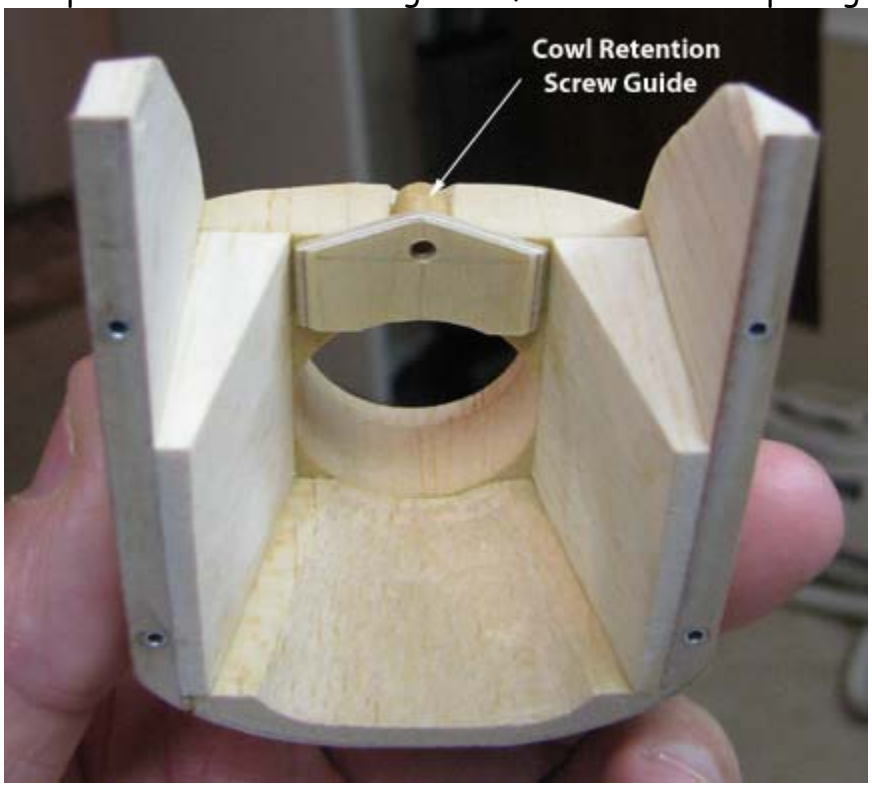
In developing a method for attaching the cowl to the firewall, the simplest approach was taken using a single 4-40 "screw assembly", which will be explained later. For the assembly to be effective, it has to be located so as to apply equal pressure on each of the four cowl alignment pins. The exact center location is defined by the intersection of the two diagonals between the four pins as shown below. However, the threaded hole had to be moved down about a 1/4" so as not to interfere with motor mount.



A small plywood square an 1/8" thick was glued to the back of the firewall to provide additional threads for the cowl screw as shown below. Holes were drilled in the firewall and back plate separately with a No. 43 bit. The shank of the bit was inserted into the firewall and used to align the 1/8" plywood square on the back while the glue dried. Then 4-40 threads were cut through both pieces at the same time.

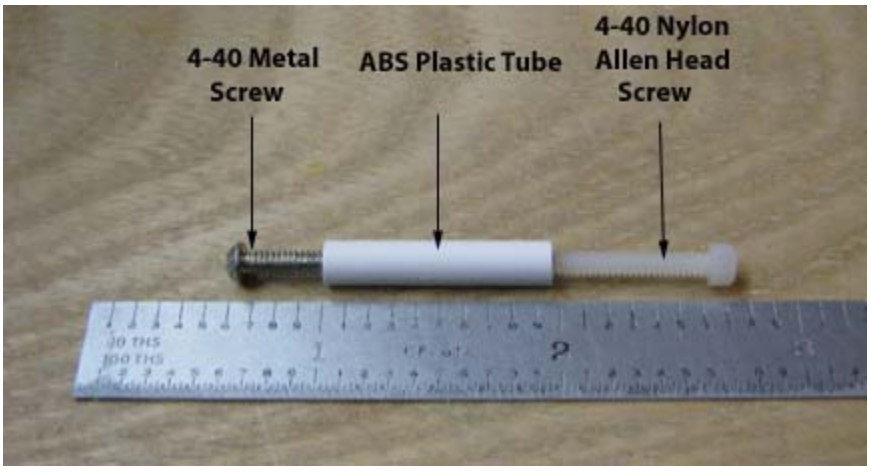


The center of a piece of 3/16" (this wrong, it should be 1/4") wooden dowel was drilled out for a 4-40 screw to slide through. This was glued to a piece 1/16" plywood and the two in combination were glued to the forward inside face of cowl nose block as shown below. This plywood plate serves as a strong back for the screw to pull against.



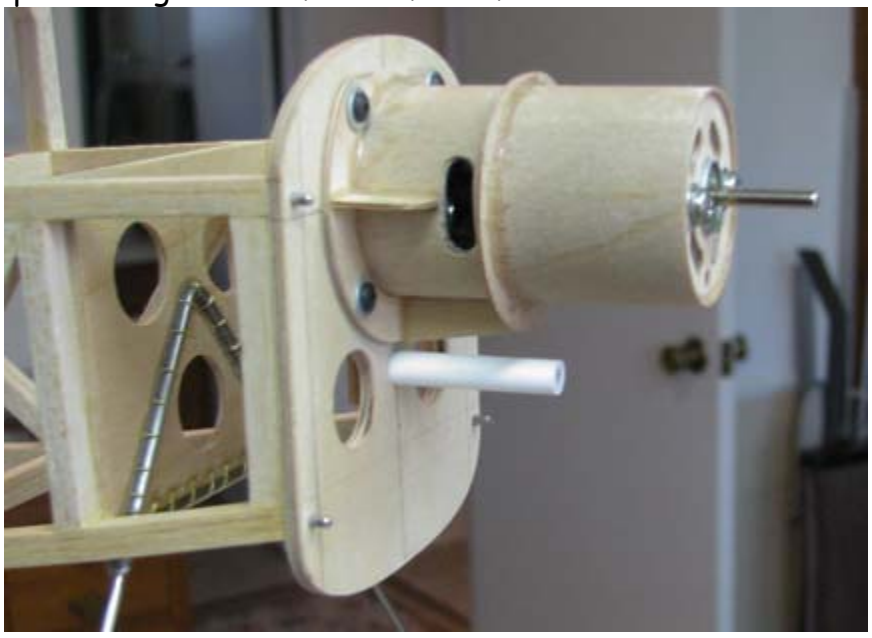
As part of the Cloudster's on going weight saving effort, a 4-40 screw assembly referred to above was used for the cowl attachment instead of a long heavier 4-40 metal Allen head screw. The principal element of this assembly is a 1" length of white ABS plastic tubing threaded inside each end with 4-40 threads as shown below.

The complete 4-40 screw assembly, which is shown below, is composed of a short 4-40 metal screw, a 1" length of threaded ABS plastic tube, and longer 4-40 Allen head nylon screw. The total weight is something less than one gram because on the AccuLab scale, it reads zero.

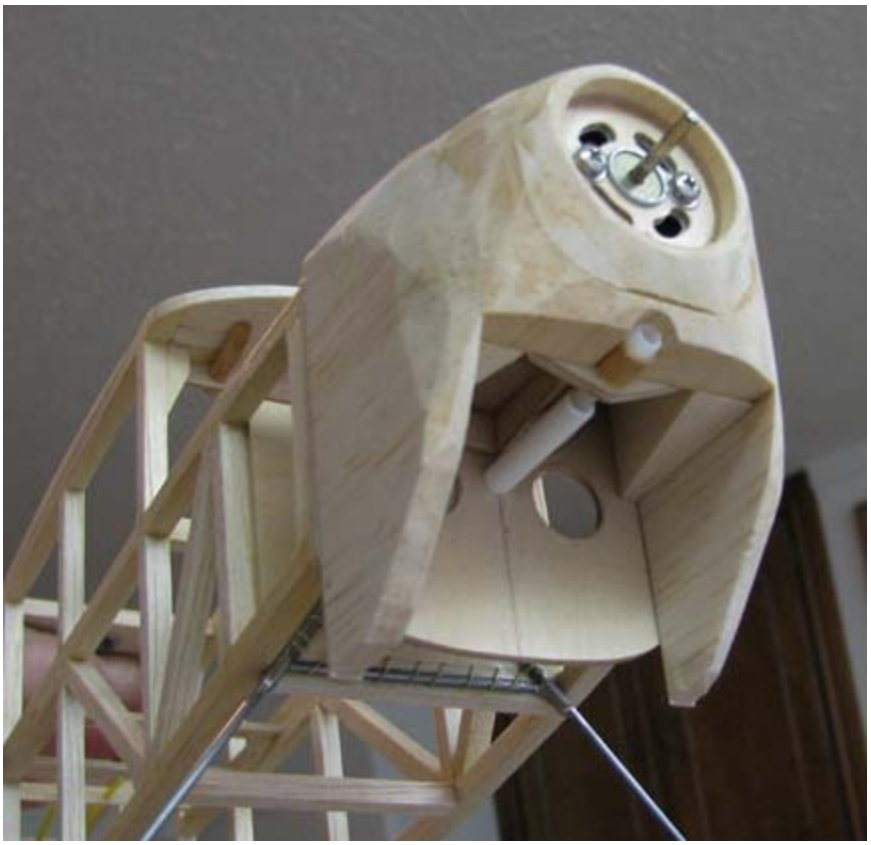


The 4-40 metal screw is screwed in from the back side of the firewall as shown below.

The 1" length of threaded ABS plastic tubing is screwed finger tight onto the threads of the metal screw protruding out the front of the firewall as shown below.



This is a view from underneath the unfinished cowl. It shows how the cowl is secured to the firewall by inserting the 4-40 Allen head nylon screw through the cowl retention screw guide ***(the drilled out dowel)***, screwed into the open end of the threaded ABS plastic tube, and then tightened down, which pulls the cowl down snug onto the front face of the firewall.



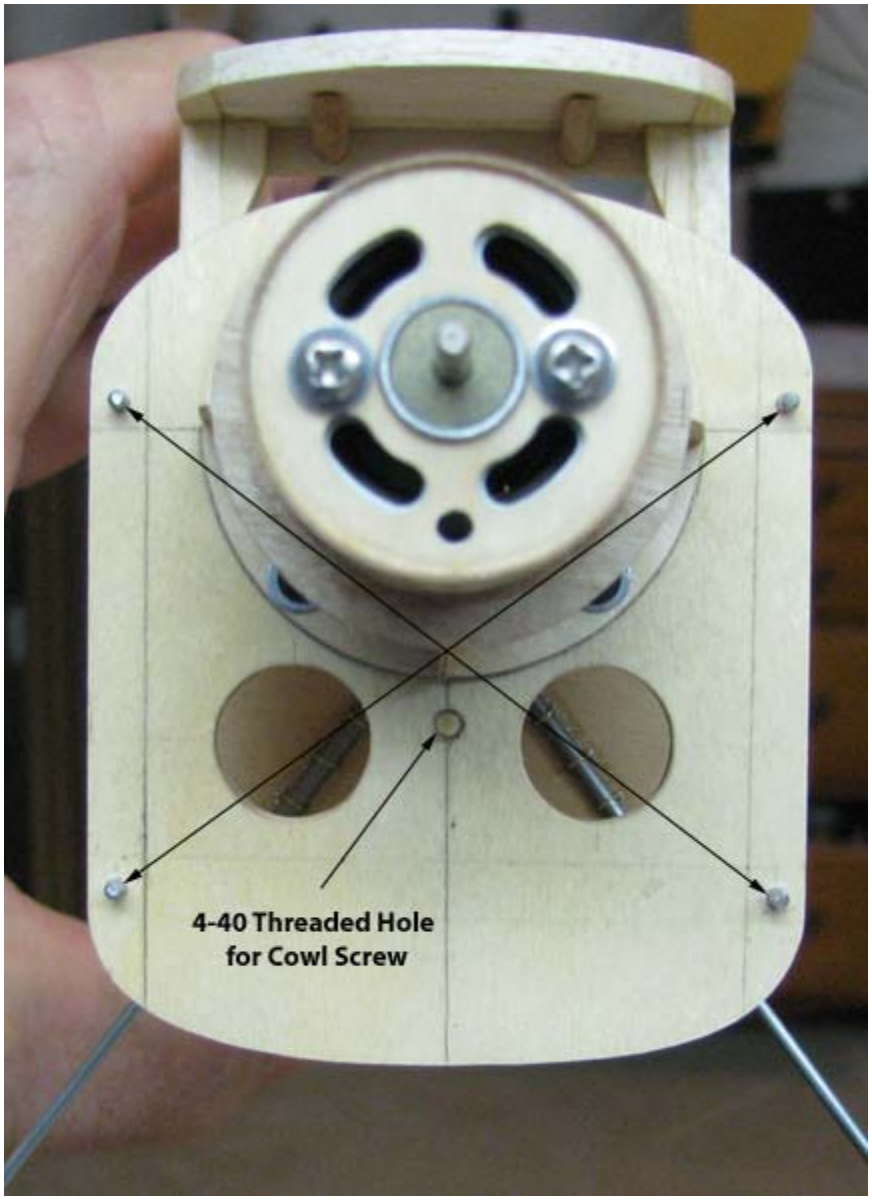
I am most pleased with the way this method for attaching the cowl to the firewall worked out. Now the bottom of the cowl has to be blocked in with a large opening left in the front to provide motor cooling air. However, as was said before, carving, sanding, and shaping of the cowl can not be continued until the bottom bulkheads and stringers have been added as well as the curved planking on the top of the fuselage right behind the firewall. This is necessary to fair the lines of the cowl into the lines of the fuselage to form the seamless transition.....Tandy

David Harding

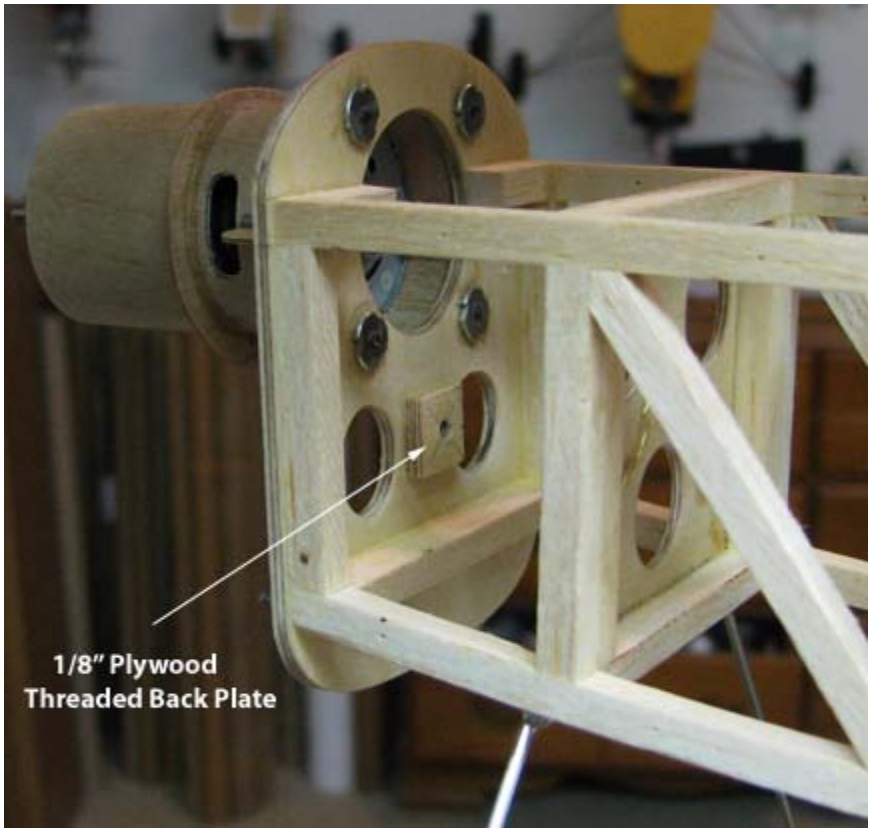
From: Tandy C. Walker [tandyw@flash.net]
Sent: Wednesday, February 03, 2010 11:55 AM
To: Undisclosed-Recipient: ;@smtp106.sbc.mail.mud.yahoo.com
Subject: 53 Speed 400 Cloudster - Cowl Retention

Speed 400 Cloudster Project

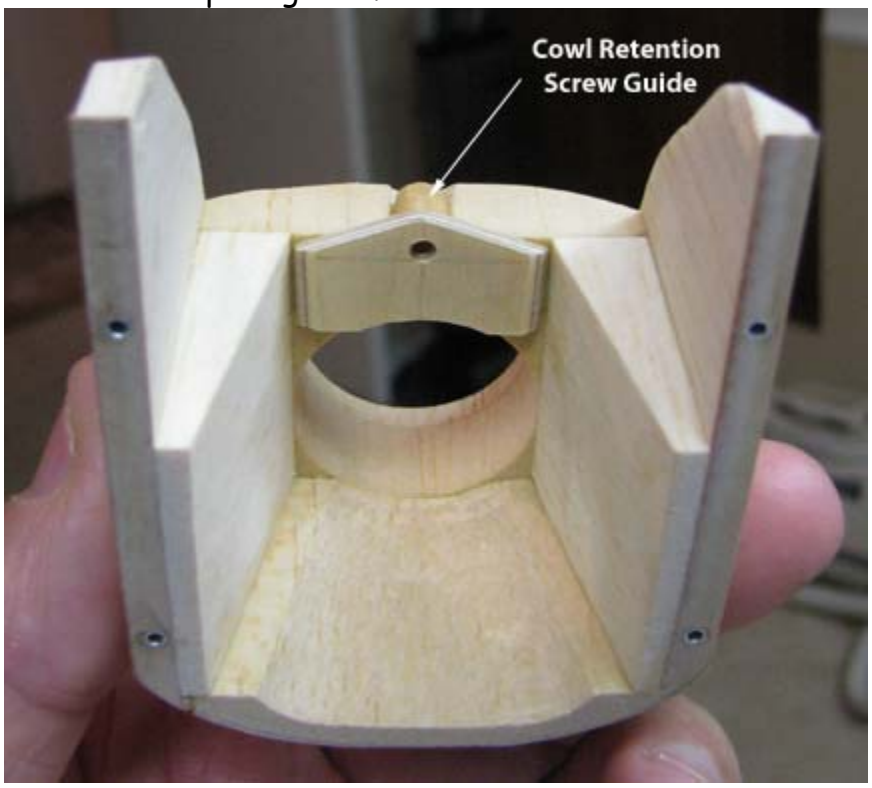
In developing a method for attaching the cowl to the firewall, the simplest approach was taken using a single 4-40 "screw assembly", which will be explained later. For the assembly to be effective, it has to be located so as to apply equal pressure on each of the four cowl alignment pins. The exact center location is defined by the intersection of the two diagonals between the four pins as shown below. However, the threaded hole had to be moved down about a 1/4" so as not to interfere with motor mount.



A small plywood square an 1/8" thick was glued to the back of the firewall to provide additional threads for the cowl screw as shown below. Holes were drilled in the firewall and back plate separately with a No. 43 bit. The shank of the bit was inserted into the firewall and used to align the 1/8" plywood square on the back while the glue dried. Then 4-40 threads were cut through both pieces at the same time.

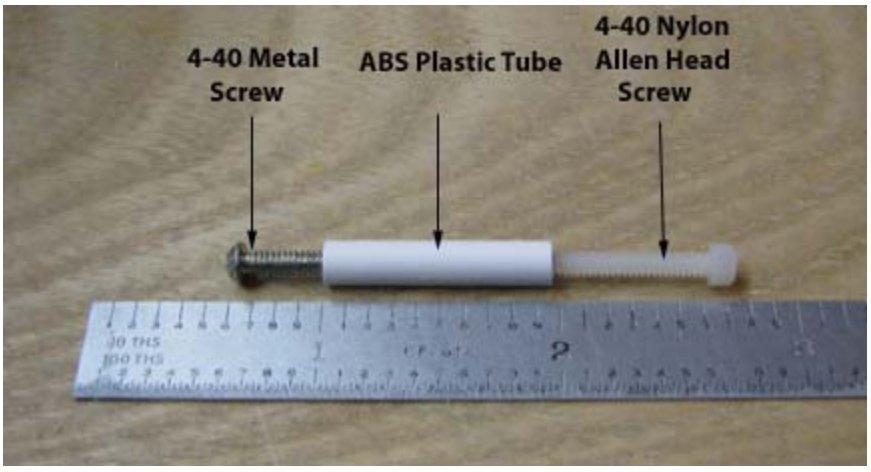


The center of a piece of 3/16" wooden dowel was drilled out for a 4-40 screw to slide through. This was glued to a piece 1/16" plywood and the two in combination were glued to the forward inside face of cowl nose block as shown below. This plywood plate serves as a strong back for the screw to pull against.



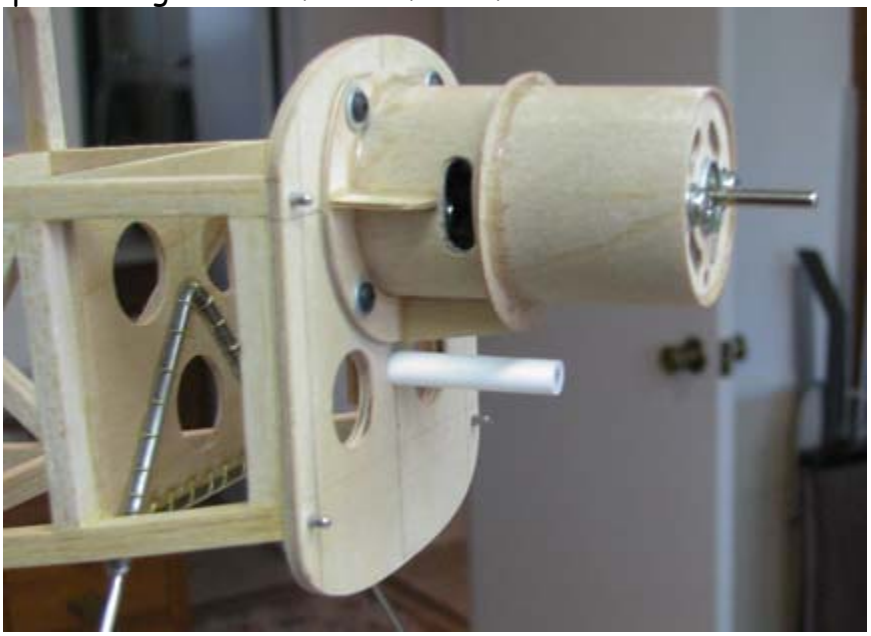
As part of the Cloudster's on going weight saving effort, a 4-40 screw assembly referred to above was used for the cowl attachment instead of a long heavier 4-40 metal Allen head screw. The principal element of this assembly is a 1" length of white ABS plastic tubing threaded inside each end with 4-40 threads as shown below.

The complete 4-40 screw assembly, which is shown below, is composed of a short 4-40 metal screw, a 1" length of threaded ABS plastic tube, and longer 4-40 Allen head nylon screw. The total weight is something less than one gram because on the AccuLab scale, it reads zero.

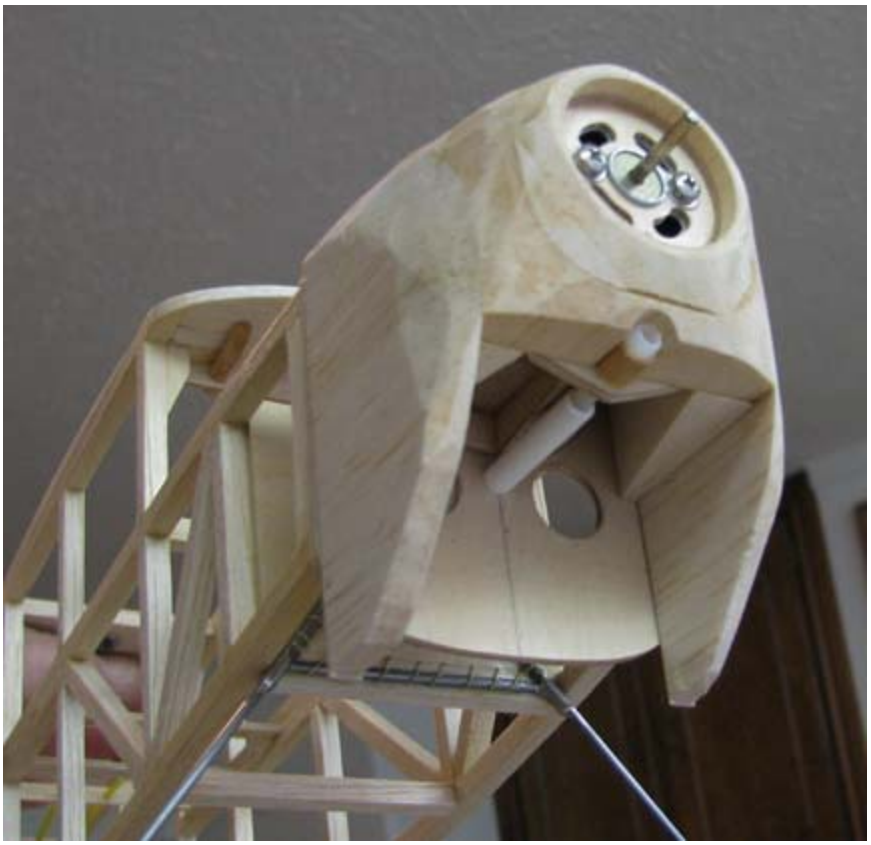


The 4-40 metal screw is screwed in from the back side of the firewall as shown below.

The 1" length of threaded ABS plastic tubing is screwed finger tight onto the threads of the metal screw protruding out the front of the firewall as shown below.



This is a view from underneath the unfinished cowl. It shows how the cowl is secured to the firewall by inserting the 4-40 Allen head nylon screw through the cowl retention screw guide ***(the drilled out dowel)***, screwed into the open end of the threaded ABS plastic tube, and then tightened down, which pulls the cowl down snug onto the front face of the firewall.



I am most pleased with the way this method for attaching the cowl to the firewall worked out. Now the bottom of the cowl has to be blocked in with a large opening left in the front to provide motor cooling air. However, as was said before, carving, sanding, and shaping of the cowl can not be continued until the bottom bulkheads and stringers have been added as well as the curved planking on the top of the fuselage right behind the firewall. This is necessary to fair the lines of the cowl into the lines of the fuselage to form the seamless transition.....Tandy

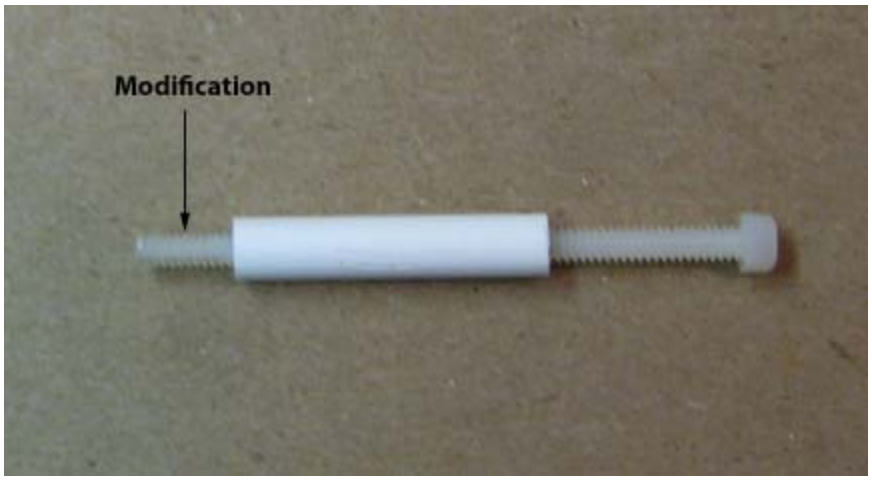
David Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Thursday, February 04, 2010 6:28 AM
To: Undisclosed-Recipient: ;@smtp106.sbc.mail.mud.yahoo.com
Subject: 54 Speed 400 Cloudster - Cowl Retention Modification

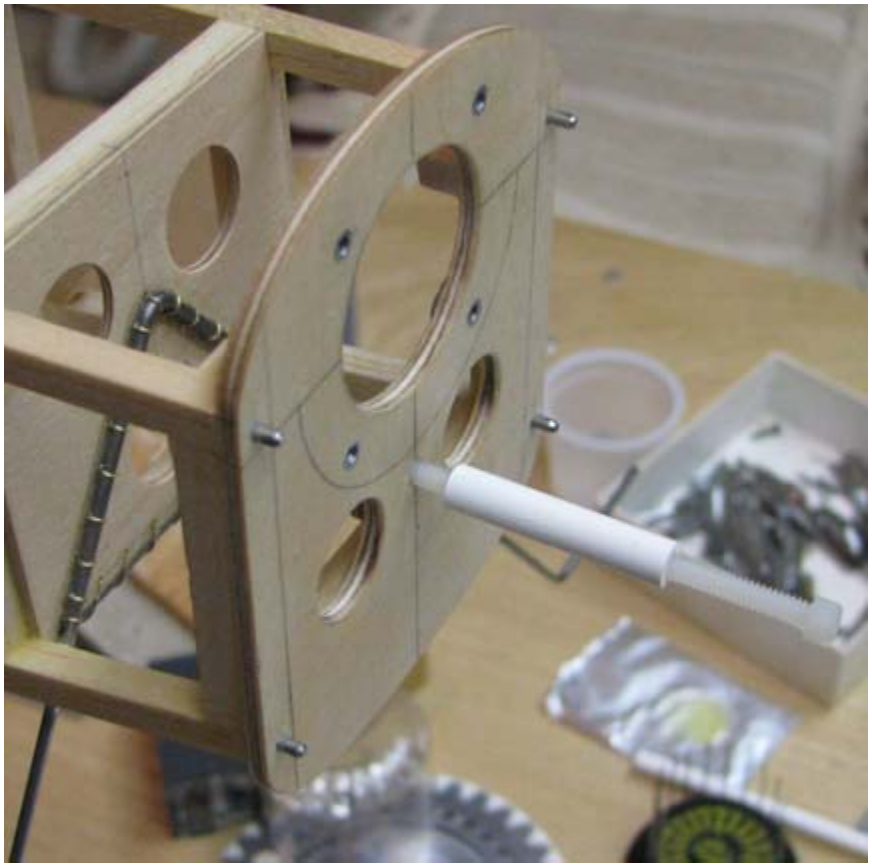
Speed 400 Cloudster Project

In the previous Report No. 53, a 4-40 metal screw was screwed in from the back side of the firewall to secure the threaded ABS plastic tube to the front of the firewall as shown below. It is difficult to anticipate some potential problems and a concern arose that once the fuselage was completed there would be no way to access this screw, should the need arise.

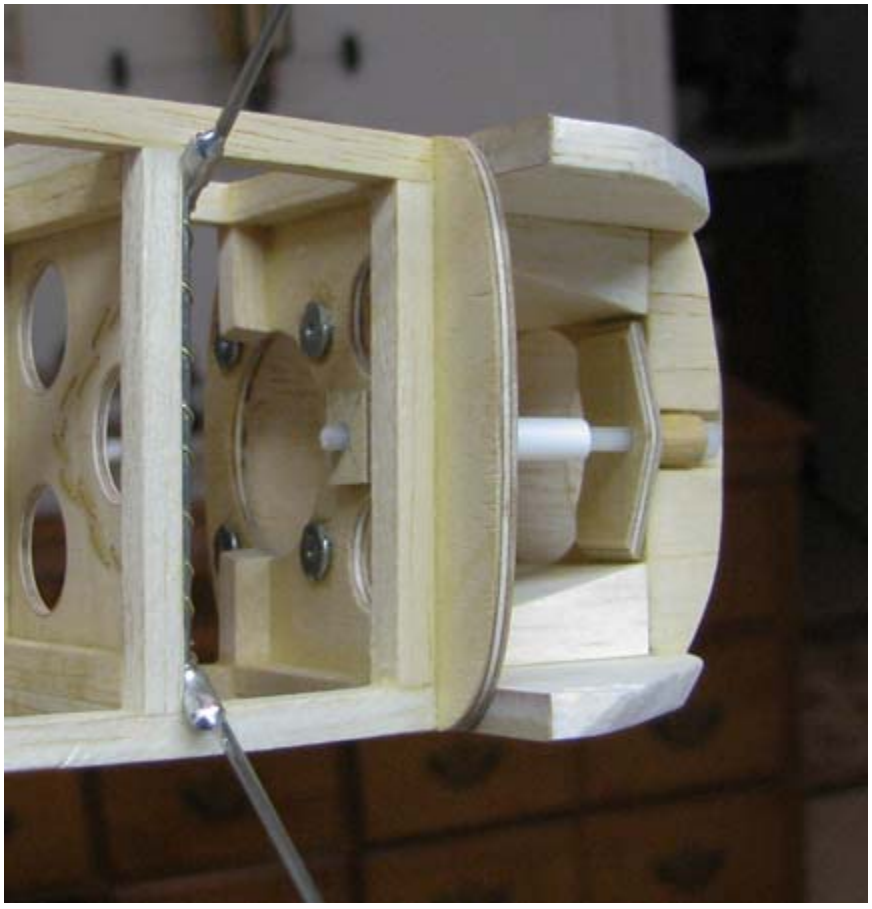
To resolve this problem, a 4-40 Allen head nylon screw was screwed into the firewall end of the threaded ABS plastic tube as tight as it would go just short of twisting it off. Then the screw was cut off leaving a 5/16" length of nylon threads as shown on the left below.



Now the ABS plastic tube with its length of nylon screw can be threaded into the firewall from the front as shown below thus eliminating the requirement to access the firewall from the back side.



The picture below shows the cowl neatly attached to the firewall with the newly revised 4-40 screw assembly. This is not only a more user friendly design, but also eliminates the metal screw and saves a little weight to boot.....Tandy



David Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Thursday, February 04, 2010 8:55 PM
To: Undisclosed-Recipient: ;@smtp106.sbc.mail.mud.yahoo.com
Subject: 55 Speed 400 Cloudster - Making the Turtle Deck Behind the Firewall

Speed 400 Cloudster Project

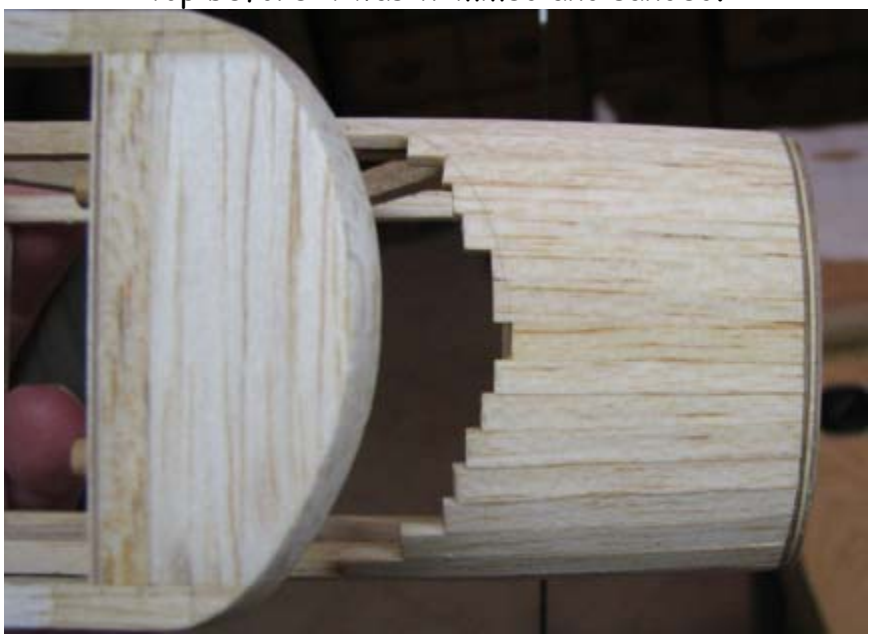
The work today focused on constructing the turtle deck right behind the firewall. The first step was to cut out and sand the two bulkheads from 1/16" medium hard balsa as shown below. No, those are not lightening holes in the top bulkhead!

As you can see in the picture below, the two hole are openings for the two top blind nut on the firewall that permit the balsa bulkhead to be glued to the back of the firewall.

Soft balsa 3/32" X 3/16 strips were cut in graduated lengths, tapered, beveled along the sides, and individually glued to the two bulkheads to form the turtle deck surface as shown below.

This is a view of the completed strip planking on the turtle deck looking down from the

top before it was trimmed and sanded.



The aft edge of the strip planking was trimmed off around the cockpit area and the turtle deck's outer surface was then carefully sanded flush with the top of the arched contour of the firewall. With good tight strip joints, the surface of the sanded turtle deck appears to be sheeted a continue piece of 3/32" sheet balsa as shown below. I am most pleased with the appearance of the turtle deck.....Tandy

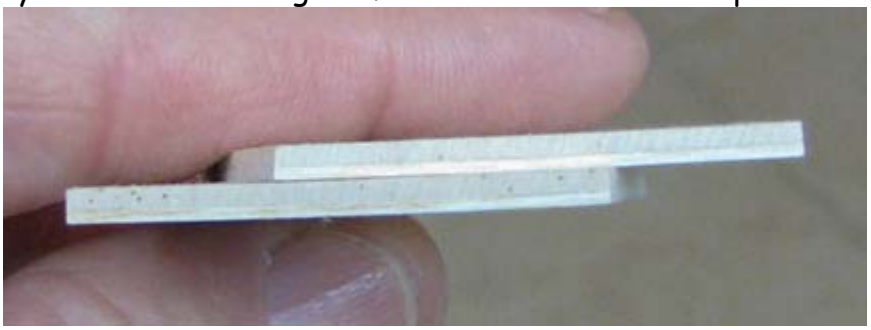
David Harding

From: Tandy C. Walker [tandyw@flash.net]
Sent: Sunday, February 07, 2010 5:15 PM
To: Undisclosed-Recipient: ;@smtp107.sbc.mail.mud.yahoo.com
Subject: 56 Speed 400 Cloudster - Making the Battery Box and ESC mount

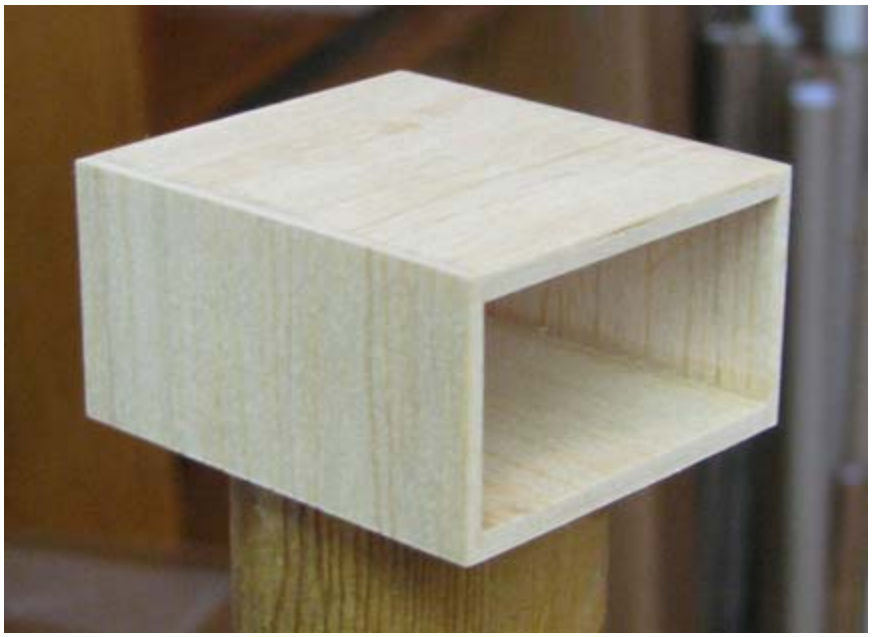
Speed 400 Cloudster Project

To obtain a light stiff battery box, the top and bottom of the box was made by laminating 1/32" sheet balsa with 1/16" sheet balsa. Since these were bonded with aliphatic glue, they had to be clamped down tightly while the glue dried as shown below.

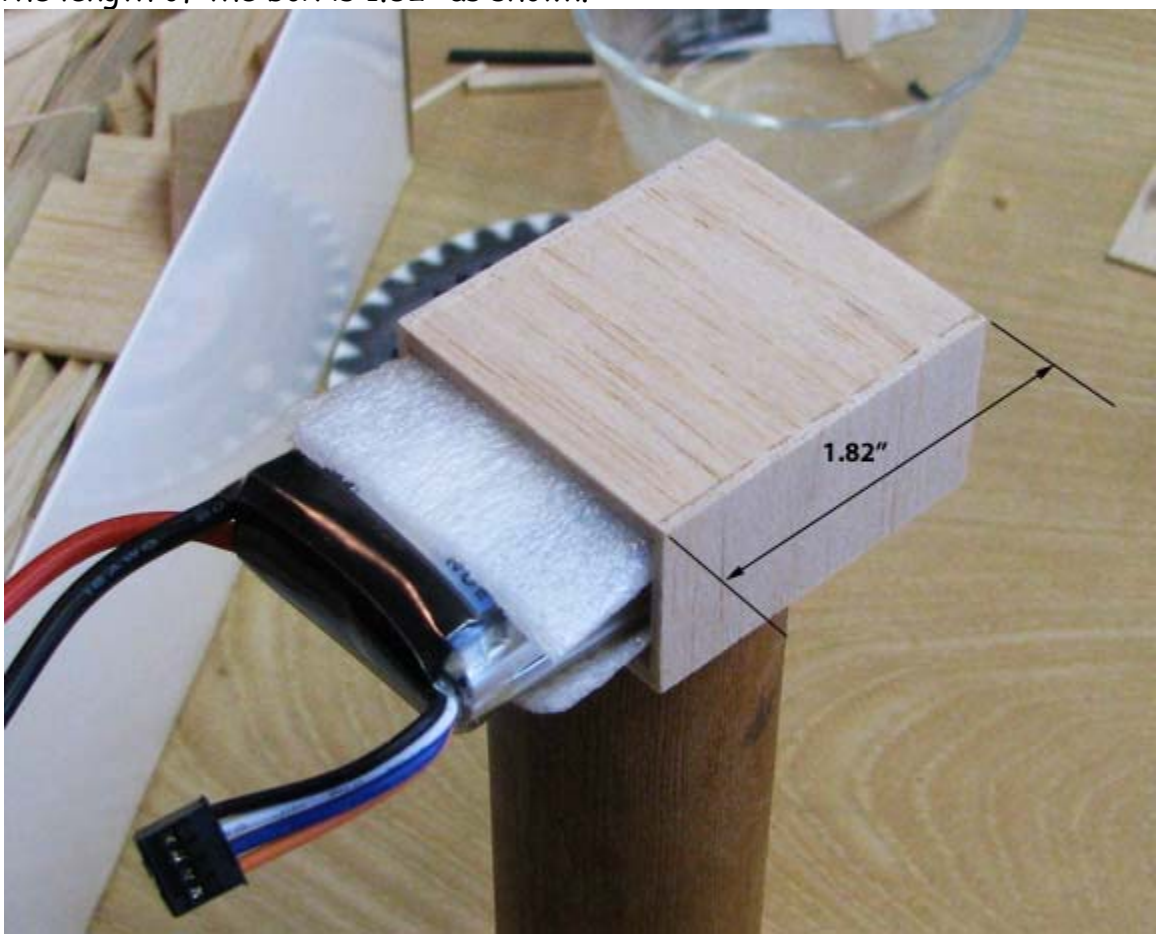
Here you can see the edges of the box's laminated top and bottom.



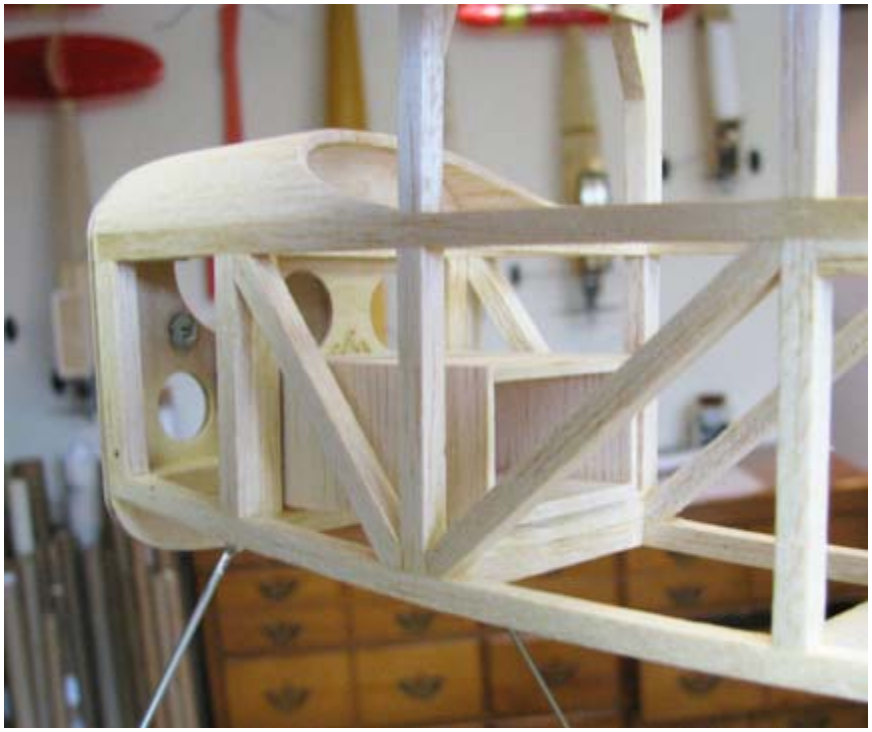
This shows the battery box assembled with 1/16" balsa vertical grain sides.



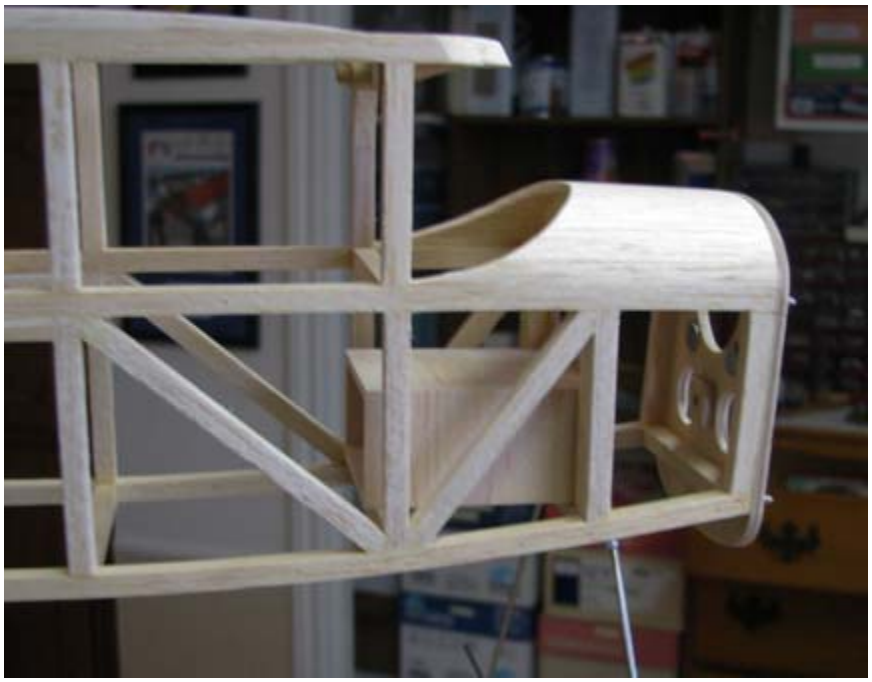
This picture shows the Li-Po battery slipped the battery into the box with foam to snug it up. The length of the box is 1.82" as shown.



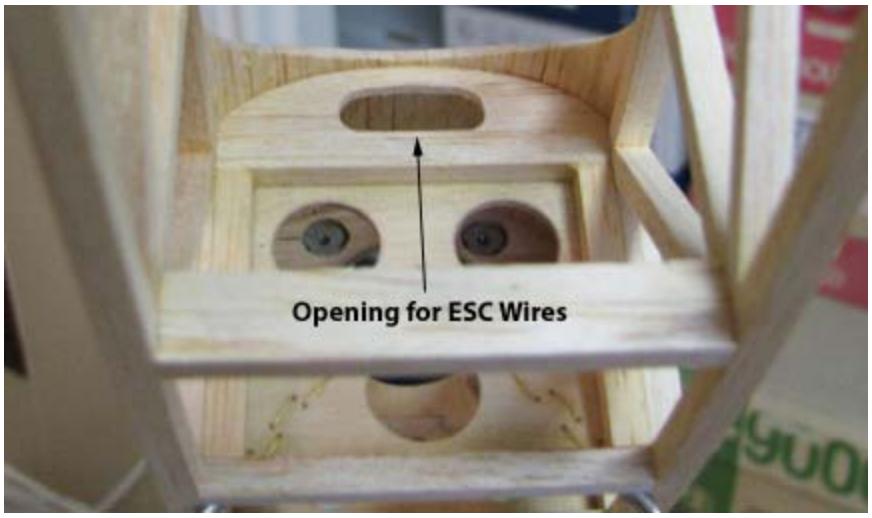
A trial fit of the battery box inside the fuselage structure is shown below.



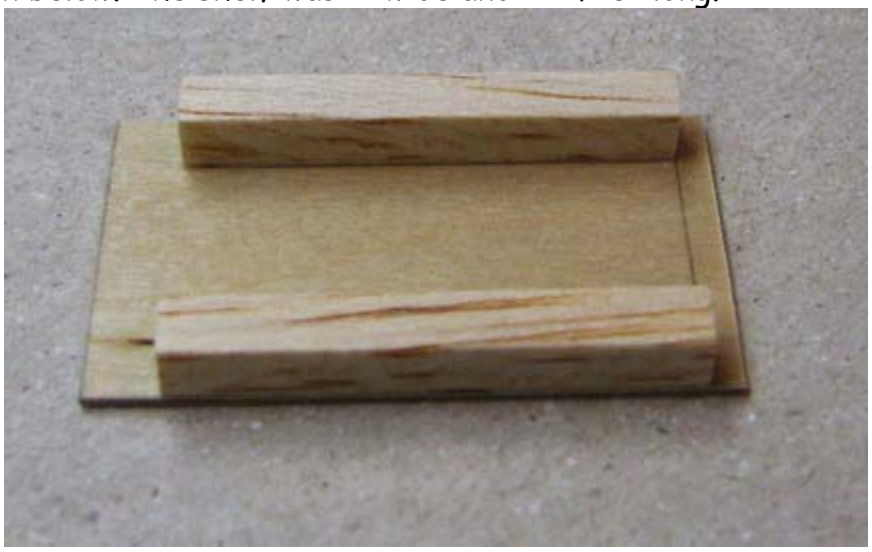
The length of the battery box is constrained so that the battery can be removed for charging from the bottom bay directly below and behind the battery box as shown below. This bay will be fitted with a removable hatch cover.



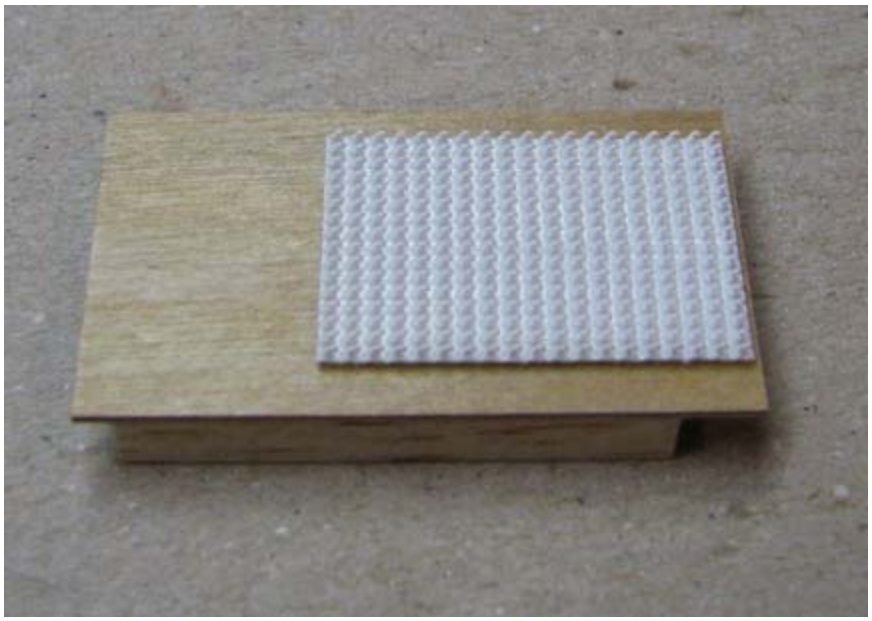
The Electronic Speed Control (ESC) will be mounted on a shelf above the battery box. Therefore it was necessary to go in under the planked turtle deck and make the opening shown below for the ESC wires to go through to the Speed 400 motor. This was a little difficult, but doable.



The shelf for the ESC was constructed of 1/32" plywood with two 3/16" square balsa runners as shown below. The shelf was 1" wide and 1-11/16" long.



The top of the shelf was given two coats of clear dope with a light sanding in between coats. Then the hook side of Velcro was attached as shown below.



The shelf was then glued into the fuselage structure as shown below.

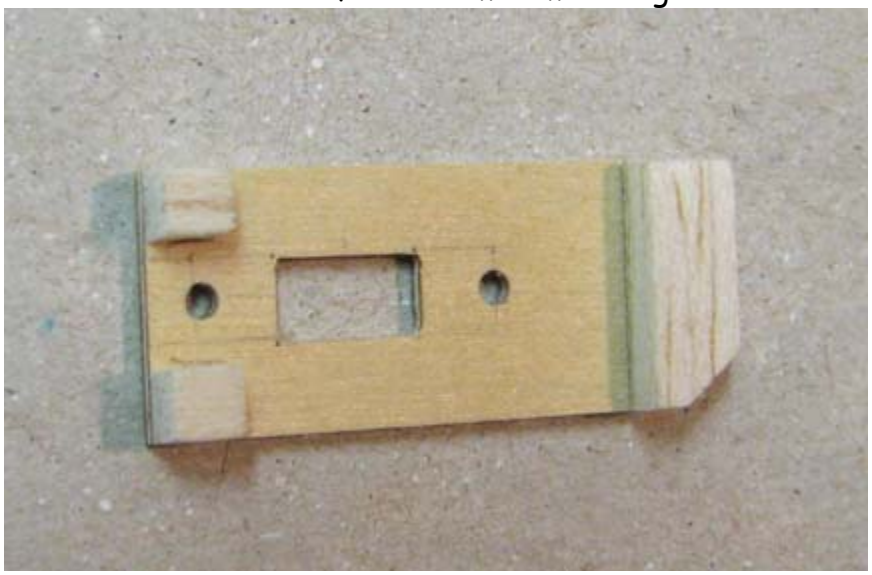
This shows the shelf from the bottom with the two runners.....Tandy

David Harding

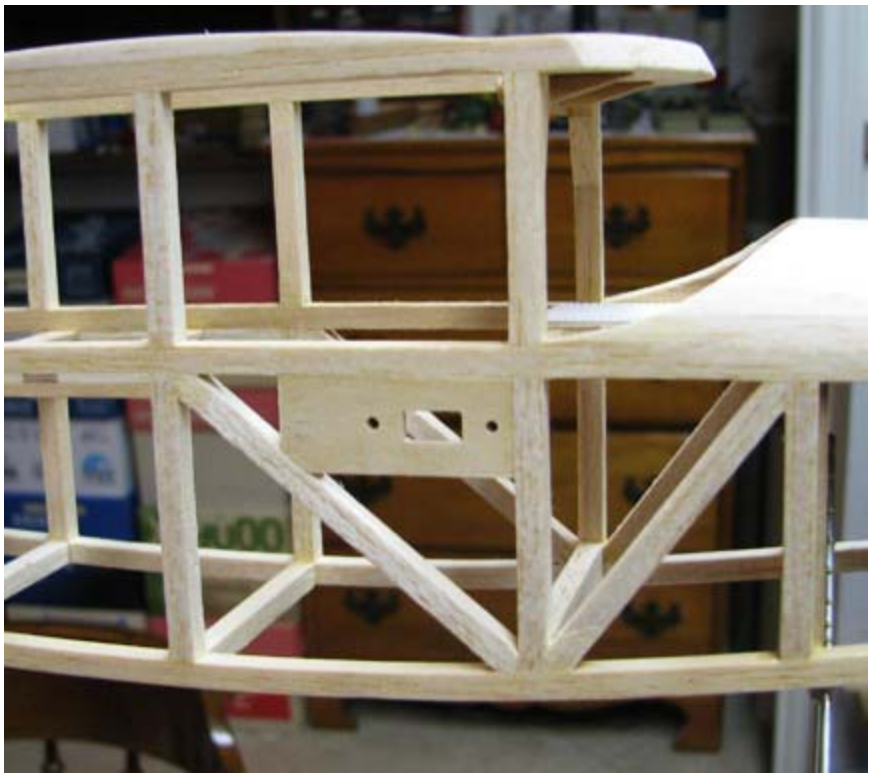
From: Tandy C. Walker [tandyw@flash.net]
Sent: Monday, February 08, 2010 9:06 PM
To: Undisclosed-Recipient: ;@smtp101.sbc.mail.mud.yahoo.com
Subject: 57 Speed 400 Cloudster - Making the ESC Switch Mount

Speed 400 Cloudster Project

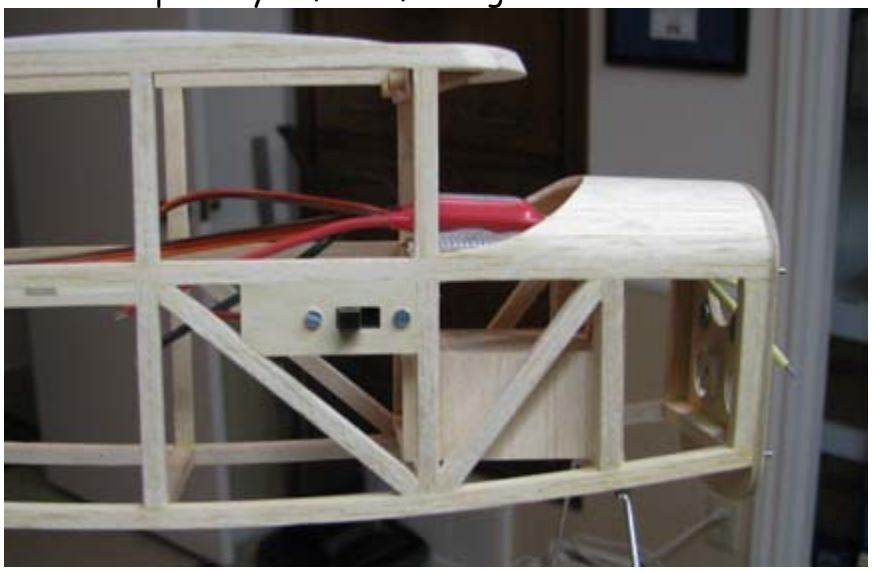
The JESI 12 Amp Electronic Speed Control (ESC) comes with a switch already installed on the unit. I guess it serves as a safety "kill switch" to completely disable the ESC. The ESC switch mount is made out of 1/16" plywood with 1/8" balsa glued to the inside as shown below. A rectangular opening was made in the 1/16" plywood for the switch slide to go through and two holes were drilled for the small mounting screws also shown below.



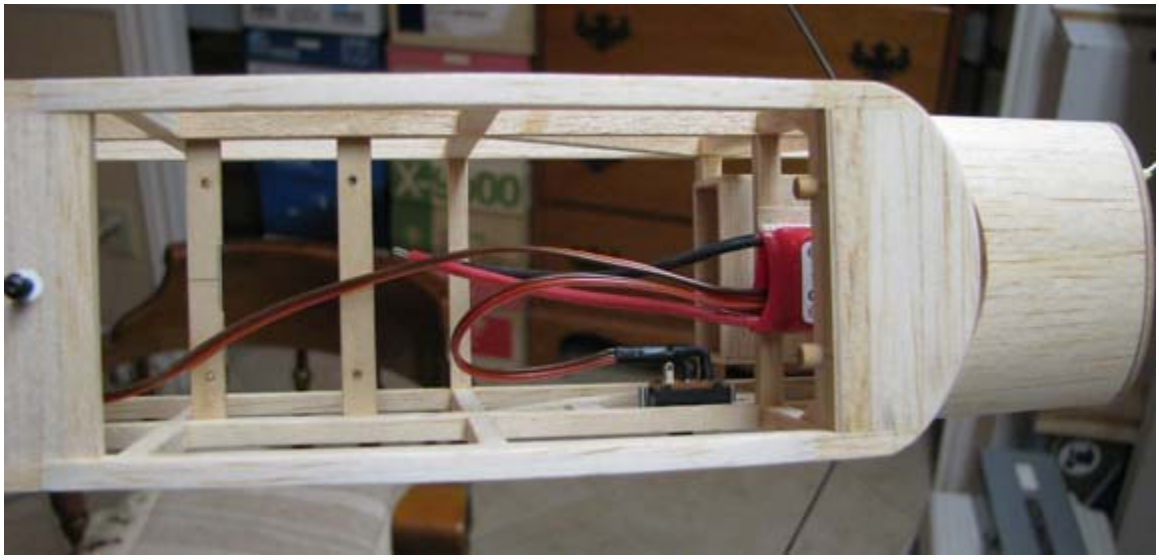
This picture shows the switch mount integrated into the right side of the fuselage structure. I was going to put it on the left side, but ended up putting it on the right instead. This was because James Lollar said he was going to put his switch on the right side and when I checked all of my other models, sure enough their switches were on the right side also.



Here the ESC switch is shown from the outside screwed to its mount. Notice the switch is well above the battery box so it does not interfere installing and removing the flight battery. The first three open bays of the fuselage sides will be inlaid with 1/16" balsa.



This picture shows the wire routing from the ESC unit to mounted switch.



I received some very good instructions from Jay Burkart (an experienced electric flier) today on how to use connectors to hook the two ESC yellow wires to the back of the Speed 400 motor, which I will share with you later when the connectors are installed.....Tandy