

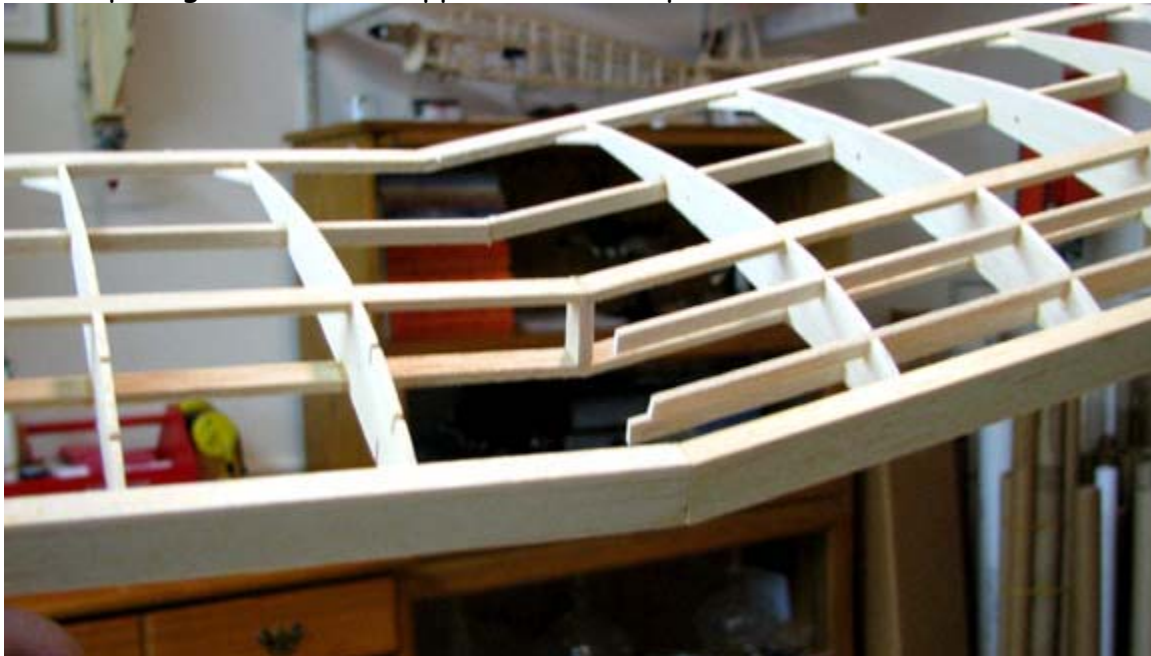
**David Harding**

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**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.



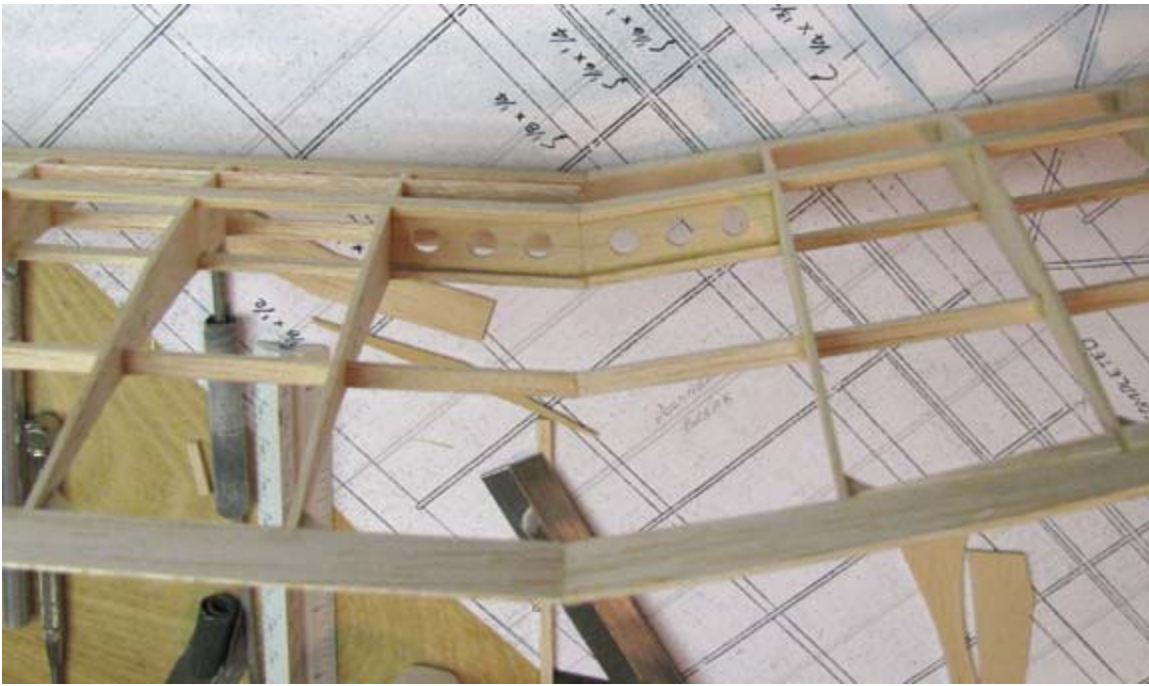
In order to fabricate a plywood polyhedral brace that will fit between the two main spars, a template was drawn by pressing a trimmed sheet of  $1/16"$  up against the forward face of the main spars and tracing an outline from the rear inside the two spars. The  $1/16"$  balsa template was cut out as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



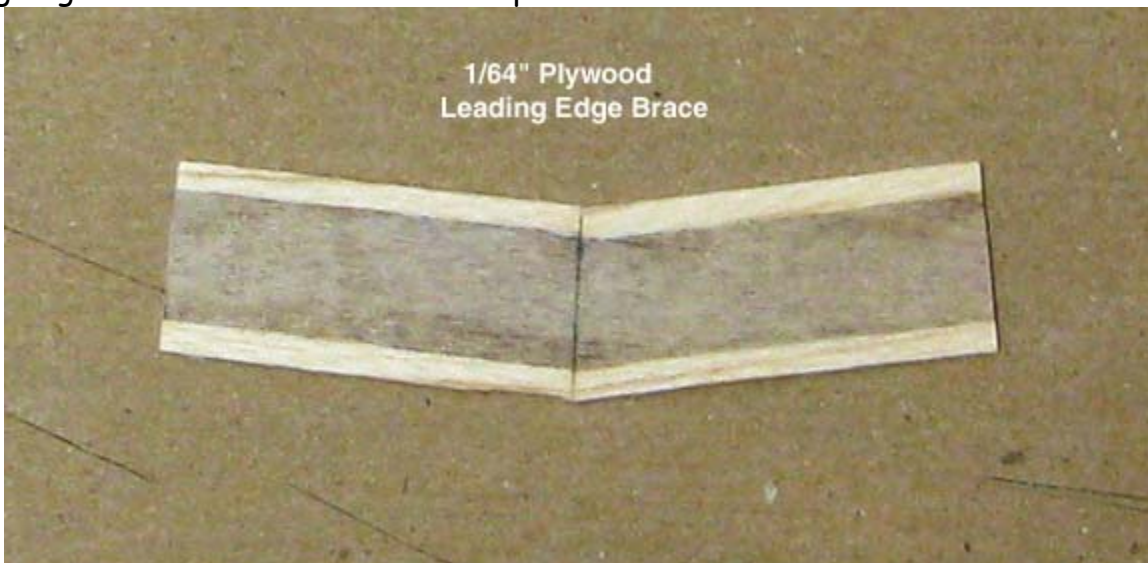
The balsa template was then placed on a sheet of 1/16" plywood and the pattern traced onto the plywood. The plywood brace was cut out and sanded to fit in between the two main spars (things like this never fit properly without a little hand tweaking). As part of the Cloudster's on going weight saving effort, six 1/4" lightening holes were carefully located and made in the plywood brace as shown below before it was glued in between the two main spars.



The finished plywood brace was 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.



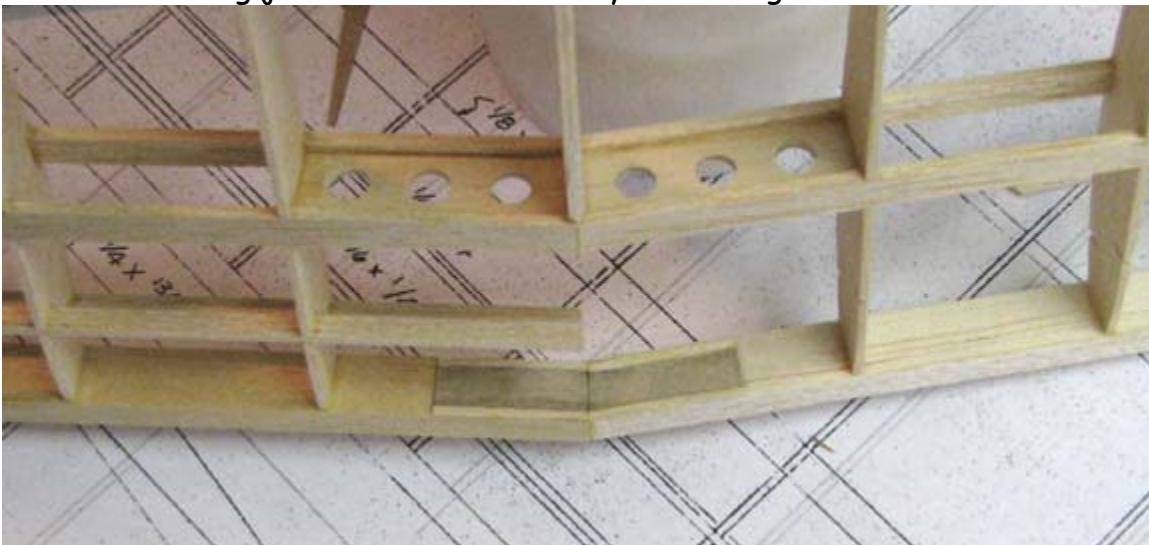
Even though there is a large cross sectional gluing area on the 1/4" X 1/2" leading edge, a leading edge brace was made out of 1/64" plywood to add further support. The brace's edges were lined with balsa as shown below so they would sand smoothly when the balsa leading edge is carved and sanded to shape.



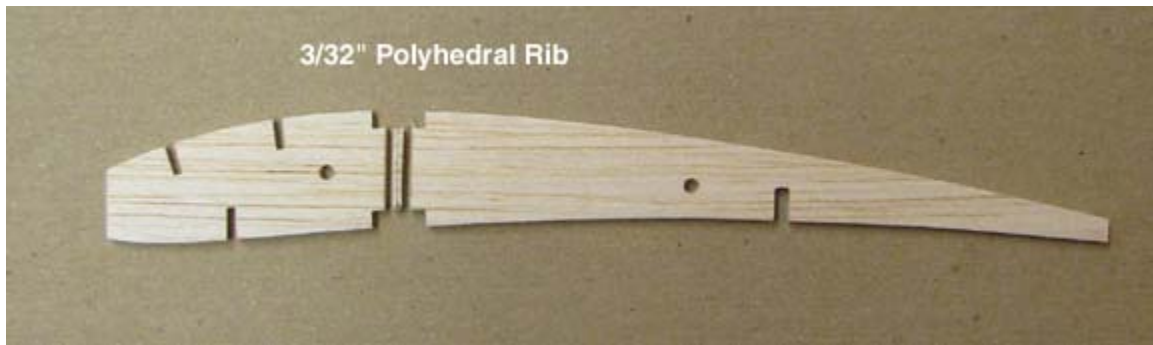
The leading edge brace was glued with aliphatic glue and clamped to the inside face of the leading edge as shown below.



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.....