

## WOOD LEADING EDGE

by

Bill Jackson

for N180AS & N180BJ

It was great for Al Seymour and myself to talk to so many current Charger builders at Oshkosh. There was considerable interest in our leading edge and the process we used and we were happy to share what we had done. We decided to write up the procedure in hopes that it will help those of you who are interested in doing the same thing.

Additional high density foam ribs were rough cut and 2 were glued between each of the original ribs using APCO glue. The foam was then shaped with a hot wire using the adjacent wood ribs as guides.

0.8mm (1/32") thick 3 ply imported Finnish Birch plywood was wrapped around the leading edge with the grain oriented parallel to the cord. The spanwise width was less than 4 feet with the actual width laid-out so the butt seam to the next piece fell on the center of a foam block. This results in a leading edge with only 2 butt seams per wing panel, but yet the individual pieces of ply are easy to cut, fit and glue in place.

Holding the wood in place while the glue sets-up was accomplished by using about 4 dozen large rubber bands and 1/4" X 1/4" X 8" sticks. The sticks are placed behind the spar then the rubber band is looped around the stick, pulled over the leading edge ply and looped around the opposite end of the stick. This same technique was used on our ailerons.

Credit rendered where credit due: this is the same technique that is used to build the Mitchell wing Ultra-light.

Good luck with your projects. All your time and effort will be worth it as you will know when you are in the air . . . at last. See you there.



About a third of the way into the project Ray Stevens came to the Evergreen Fly-in and graciously let Bill and Al fly his airplane, N11RS. (Rays Charger is now owned by Jeannie Williams and she can be seen flying it at air shows.) If Bill and Al needed further evidence that they had made the right choice they got it. The memory of that flight stayed with them, luring them to the finish.

The first Charger flew in August 1986 with no re-rigging necessary except for the pilots knees (which were weak and shaking); that was Al in N180AS. Bill flew N180BJ 6 months later in April 1987. They flew 1 1/2 years in silver to make sure no problems or changes were necessary prior to paint.

Then, the two Chargers, identical to this point took on their own identities with separate design and paint schemes. Al choosing a design of red, white and blue, with strips and stars, something he said he would never do to an airplane but which suits his Charger. Bill opted for a more sedate understated off white with 3 shades of red striping.

Along the years 3 of Seymours 6 children married and they acquired 6 grandchildren, While Jacksons 3 children married and 3 grandchildren arrived. One of Seymours sons is a pilot and one of Jacksons is a student pilot. Bill and Al also started a business together while continuing their regular work. Al retired from IBM in 1987 and started yet another company of his own. Bill is just leaving Tektronix after 23 years to devote more time to their business. Bette works for Bill and Al and has run the daily operation of the company for the past 5 years. So yes, there was life happening other than the building of the Chargers.

Through the years as progress was slowly being made Bill and Al planned and dreamt of the trips they would make together with their Bi-planes; Evergreen, Watsonville and then Oshkosh. And finally it happened. The first air show where both airplanes were judged was Evergreen 1989 and both Chargers won awards. Then came Watsonville 1990 and again both won awards. Now as the 20th anniversary of the original Charger approaches N180AS and N180BJ hope to join up with many other Chargers in July and show these beautiful Biplanes at Oshkosh.

Now the dream is real. You can see these two Chargers living the dream, flying the Willamette valley the sun reflecting off the paint and glistening off the flying wires. And if you can't see the faces of the pilots you've just got to know they are smiling, happy and content.

P.S. Oshkosh has come and gone (a 35 hour trip), and we are happy to report that N180AS won an award for OUTSTANDING WORKMANSHIP in the custom aircraft category. Hooray for Chargers!!!



## DOUBLE VISION

by  
Bette Jackson

Dream . . what pilot hasn't? The dream of building and flying that perfect flying machine. Stick in hand, your machine responding to the slightest suggestion, the deep blue Oregon sky and green velvet fields background every move, and maybe even flying wires singing, echoing the joy you feel. Al Seymour and Bill Jackson had such dreams, and often talked of the possibility; but talk was as far as it ever went except . . the dream stayed.

Then, one day in June 1975, Al Seymour received his Sport Aviation magazine and there on the cover was a MA5 Marquardt Charger. He knew at that instant he wanted one and he wanted to build it himself. He ordered the plans and when they arrived he walked across the street to Bill Jackson's house and said "Bill, I think we should each build an airplane, and I think they should be Chargers". Together, pouring over the plans excitement mounted and Bill agreed "Chargers it is, let's do it". Then and there began an 11 year project.

The Jacksons and Seymours have lived on Sunset Airstrip, a flying community near North Plains Oregon, for many years. They are neighbors, friends and business partners. Both have over 2000 hours of flying in everything from Gyrocopters to the turbo Beechcrafts. Both are instrument rated; Al is multi-engine rated and Bill is float-plane rated. But the flying doesn't end with the men. Both wives are pilots as well. Joanne Seymour earned her private license in 1982 in her Warrior. Bette Jackson has been flying since 1976 in their J3 Cub and Bonanza, and received her float-plane rating in 1989.

And now for a bit about the project. Not a kit airplane these Chargers. Rough cut spruce was bought and permanent fixtures were built for the wing ribs. They glued the ribs, one a day, which took all summer, 90 days 90 ribs. They built a permanent fixture for each wing with a 10 degree sweep. The lower wings were built on the fuselage so they matched. (The wing jig was later used for the annual Sunset Airstrip picnics.)

Unique features of these Chargers include:

Additional foam ribs cut and placed between the other nose ribs and shaped with hot wire and then plywood attached to the leading edge to provide an extremely smooth surface and prevent "oil canning";

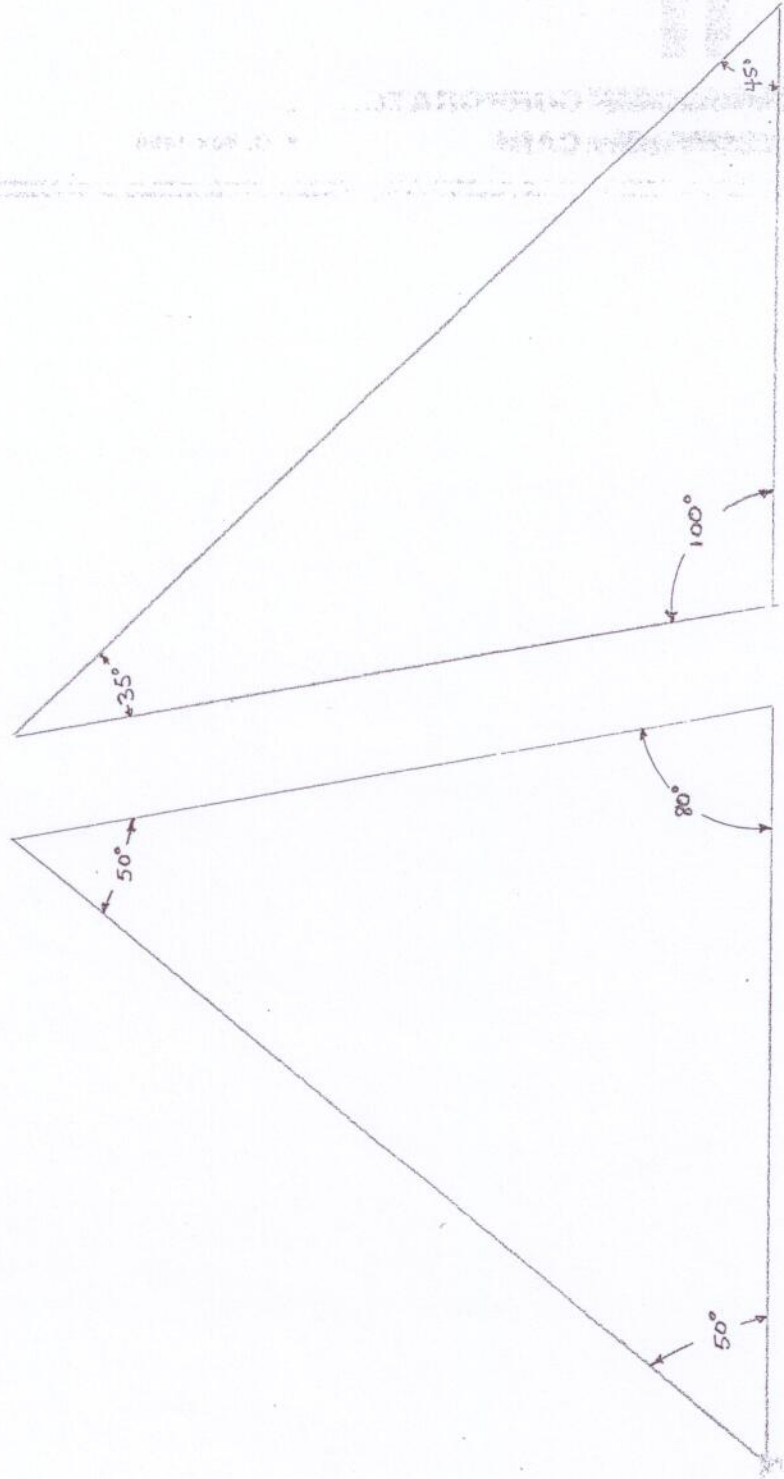
Wing root fairings hand formed from aluminum.

Fully inverted oil and fuel system.

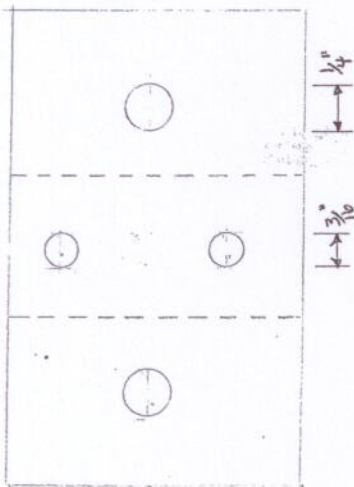
Smoke system.

During construction several unique fixtures were necessary such as; a complete rotating fixture for the fuselage and wings as well as tubing benders and fixtures for holding steel tubes for trimming. The Chargers are powered with Lycoming IO-360 180 HP engines, hence the N numbers 180AS and 180BJ. Covering is Stits process using HS-90 material and they are painted with Imron.

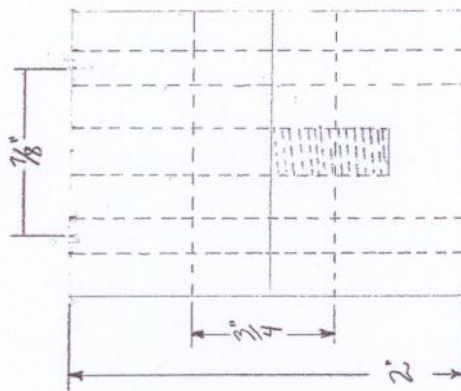
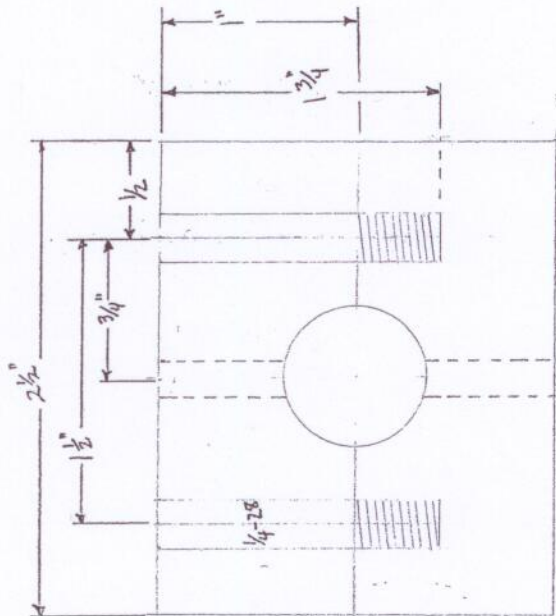
.063 Alm. Aprox,  $\frac{1}{2}$  size







Compression tube Drill Jig



DECEMBER 4, 1989

KENNY YOUNG  
6028 DOWNEY N.E.  
ALBUQUERQUE, NM 87109

Kenny,

Hi, here are some notes on wing construction and assembly that might be helpful to others. This is only a guide and not the gospel in wing construction.

1. Check spar dimensions.
2. Mark C/Ls both faces and top.
3. Trim tip ends, be sure to note forward faces to make right hand and left hand wings.
4. Mark rib, compression tubes and hinge locations on top C/L.
5. At location points mark 10 degree angle for RH or LH wing then bring center lines down both faces with square.
6. Slip ribs on spars in proper order.
7. Jig spars and set 10° angle.
8. Place ribs in proper locations (do not epoxy).
9. Fit spar doublers plates, check dimensions with wing fitting, epoxy and nail.
10. Install 10° wedge blocks for compression tubes, epoxy.
11. Install butt doubler plates, epoxy.
12. Varnish areas concealed by fittings and compression tubes, (this will save time later).
13. Install wing fittings, straps, strap fittings, turnbuckles, and wire pulls with bolts and clevis pins. Bolt and clevis pin clearance is critical once strap fittings are in place.
14. Butt fitting should not be drilled until both wing halves can be joined together or joined to fuse.
15. Recheck dimension between spars. Does it agree with fuselage fittings. Drill compression tubes holding spar dimensions.
16. Run a string down the top C/L on the front and rear spars and tighten turnbuckles, be sure to hold string on C/L, also hold 10° angle.
17. Recheck sweep and strap tension prior to epoxing ribs.
18. Upper wing position ribs epoxy shim and nail.



19. Lower wing; position ribs, epoxy shim and nail with the exception of the three ribs between the butt end and the first compression tube. This will allow for some movement if needed when you join the wing fittings to the fuselage.
20. Slide butt fittings on and move wing into position on fuselage. support wing with adjustable sawhorses.
21. Set 2° dihedral and 2° incidence then run a string from the tail post to the same location on each wing panel. These must be the same. Upper wing 1° dihedral and 1° incidence.
22. Drill wing butt fittings and install compression tube. Tack weld tube in place while wing fitting is on fuselage, this will hold butt fittings in alignment.
23. Epoxy last three ribs in place and finish wing walk area.

This is to serve only as a guide and you may want to vary the steps to your needs.

Check to see on your aileron spar, once layout is complete, that the ribs line up with the wing ribs. Mine did not and I had already cut 1/4" notches in the spars. I don't have to tell you that spruce is in short supply, so be careful! I also had problems with part #351 brace- aileron link, it was a 1/4" to short from mating properly with the trailing edge. So once again check and recheck the plans, but still it was a 1/4" short. Maybe I hoped that somehow it (part #351) would grow or the 1/4" might be found in some miscalculation. My parts were dimensionally correct to the plans, but still they were short. I had decided to remake the part's, when that little angel appeared. This angel is not the one Remo talked about, his name is Mike Finney, a builder of an Acro II. We looked at the Charger plans and at the Acro II plans, the answer was clear, after nearly a day and a half. A 1/4" plywood doubler could be epoxied to the spar. The doubler works out really well.

Kenny, I also included drawings of wing building aids that were very helpful. Wing fitting drilling jig was from Acro News Letter. Credit goes to Chuck Stottlemeyer on angles for rib alignment and compression tube drilling jig.

Thanks to all.

Mark Gilmore EAA 322796