

Subject: Re: [c-a] Outside fuselage lay-up

Date: Thu, 15 Jul 1999 21:51:52 -0400

From: Keith <Keith@TheUS.Com> *Stanley*

To: Joseph.M.Berki@lerc.nasa.gov, canard-aviators@canard.com

[The Canard Aviators's Mailing list]

At 16:50 14-07-99 -0400, you wrote:

>Has anyone performed the lay-up for the outer skin on the fuselage in
>one step?

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>I plan on supporting the fuselage on a rotisserie and would like to
>vacuum bag the lay-up. The difficulty seems to be the adhering of the
>cloth to the foam when you rotate the fuselage. I believe the Cozy guys
>do this in 3 lay-ups. The 3 lay-up method would be easier doing the
>bottom first and then each side.

>

>I believe the plans for the Long EZ state to support the fuselage at 45
>degrees, do half, wait 2 to three hours, then rotate the fuselage at 45
>degrees to do the other side. I am not sure what that means but I
>don't like waiting in the middle of lay-ups.

YES - and it still took the same 30 manhours (except I added mods so
really did more)

My experience started with the fuselage built up from nose to where the
firewall gets attached. I placed my headlight in the nose by installing
a 6.5"ID 7.5"OD PVC pipe, endcap minus the endpiece, to the most forward
nose bulkhead. Then filling in with grow foam and shaping the entire
nose gave me a very strong nose connection. Using a weight lifter's bar
with appropriate diameter weights, this was inserted and bondoed in to
provide a front pivotal point. Using two pieces of plywood to sandwich
carefully the rear seat using 3 bolts through the rear seat center
hole. Now, I used another weight lifter's bar inserted through an
angular (horizontal) hole drilled in the center of the rear seat hole.
BE SURE to bungee/wire/whatever the longerons at the firewall together
to match the width as if the firewall was installed. I removed the main
gear while leaving the nose gear installed after wrapping it in saran
wrap. After seeing that the premoulded bottom NACA engine scoop was
contrary to the results of the research, I got the information, using
sheet and grow foam I built up the rear, and I cut in a NACA scoop PER
research after I figured out the best for the space allowed. I also
scooped out the bottom airbrake and installed the under-external-skin
mountings. The area where the main gear go has a removable full
fuselage width cut out right across the NACA scoop which I pinned in
with tooth picks for the external layup.

As you can tell, I had at least the full wrap-around nose, the full
wrap-around rear area, various additional indentations to affect the lay
of the cloth, put some additional glass in the front to add more
strength for nose landings (weight here is beneficial), and the
additional layup modifications as per CP recommendations. Incidentally,
I chose to wrap the glass along the railing around and under the
longerons. So there was a fair amount of glass to be affected by
gravity while the mount did allow me to rotate the fuselodge
longitudinally with ease. I also cut all the glass that was needed for
the layup using pins to put it on the fuselage to make sure of fit.
This glass WRAPPED AROUND the entire fuselage as I was not doing the ½
at 45deg, wait, do other side approach! Took it all off carefully

rolling it AND having the glass rolls available for the inevitable mistakes that WILL happen.

I highly suggest you DO NOT ATTEMPT this layout in any manner or form, by plans or otherwise, etc. and etc., without the assistance of at least one other person while two is far better. The main time the extra help is needed is in the beginning due to the large sheets of cloth to be laid on as one needs to keep the fibers straight with proper orientation. I also do the micro onto the foam before the first cloth layer to improve adhesion. With two doing the cloth and a third doing the mixing as needed and otherwise helping the layups, it took us a total of 30 man hours. Toward the end, one can do the work as it amounts to putting smaller pieces on, finding and correcting bubbling/detachments/edge-pull-away, running a hair dryer over the surfaces to make sure the resin is well penetrated in the right amount removing the excess, and of coarse taping/pining/etc. the edges that keep trying to peel away per gravity. I skipped the peel plying while I now hear that dusting the surface with raw micro balloons may be desirable.

Unfortunately, when it all came together we were entering winter with the temperature outside the garage in the 50s. DO IT IN SUMMER WITH FRESH AIR IF AT ALL POSSIBLE. Then of the three of us, one helper after starting told me he had made an engagement and was only available for 4 hours. My second lasted 8 before she simply wore out. I took one 30-minute nap and otherwise put in the remaining 16 hours of very hard, intense, fume-laden work ever thankful that at least I got started with a crew! I kept the heaters going for the next 24 hours increasing the temperature from 70 to 90F. The job came out BEAUTIFULLY with light weight, straight fibers, no peel away, only a couple of tiny bubbles, no whiteouts, and worthy of celebration. Others have reported it took them 30 man hours as it did me so I feel it was all in line with expectations. Doing it in one pass results in a lighter, stronger, smoother job while taking a bit less total time. If redone, I would seek helpers that are more dedicated and would consider perhaps dusting the finished product with raw micro balloons.

I then moved the fuselage upside down onto a pair of saw horses to complete projects like the air brake, NACA scoop, glassing up when-upright-upper surfaces inside the nose and tail, remounting the main gear, and so on. Later, I will flip it onto its gear to resume the completion of the airplane project as I have the canard done (needed in order to do the nose before external layup) and the main spar is ready to install. Have FUN!!!