[Newsletters]
[Cozy MKIV Information]

[Prev] [Next]

COZY NEWSLETTER #55
October, 1996

Table Of Contents

Newsletter Info. Subscription Info. Authorized Suppliers

WHAT WE HAVE BEEN DOING

We had allowed 2 months (May and June) after returning from the Sun 'n Fun and Chino fly-ins to make an engine change before leaving for Arlington and Oshkosh. It would have been quite simple if we had been changing from one 4-cylinder Lycoming to another, but from the 4-cylinder Lycoming to a 6-cylinder Franklin was much more complicated. Even though we had prepared well, having built a new engine mount, new cowlings, and baffling ahead of time, and tried to anticipate any and all problems, there were still complications we hadn't anticipated. The most baffling (pun intended) was trying to even out the cylinder head temperatures. The trick which worked so well with the Lycoming, that is installing baffles in the bottom cowling to direct the air flow, just wasn't effective with the Franklin. The time to leave for Arlington was rapidly approaching, so we settled for the best conditions we had obtained to date, loaded up the Mark IV with full fuel and all our luggage for a 1 month trip, and took off early on the morning of July 7th, leaving my sister, Lee, in charge of the office. Total time on the engine since new was just 6 hours. Oddly enough, the only clouds were in Arizona, and from the Utah border on, it was severe clear. We made a fuel stop in Boise, ID, and then continued on, over the Cascades (they were sure beautiful!), to Paine Field in Everett Washington. The Franklin performed flawlessly. We had a couple of days to bum around before the fly-in started, and spent a day with the Westlands at the Boeing museum. Eric and I moved our Mark IV to Arlington on Wednesday, and Vicki and Shirley drove up to meet us.

We were very pleasantly surprised when we received our Arlington program to see that the picture on

the cover was our Cozy Mark IV, taken at Arlington the previous year. The weather for the fly-in was spectacular, and we met a lot of builders and prospective builders, and sold several sets of plans. Friday evening the Westlands hosted Cozy builders at their house for a cook-out, and we counted 35 in attendance. The Westland's Cozy project was the center of attention, and everyone agreed that Eric is doing a very good job. It was a very nice evening with good food and good fellowship!

Jim Campbell, Editor of U.S. Aviator magazine, wanted to do a feature story on the Cozy Mark IV, so I took him for a ride on Saturday; actually he took me for a ride. I started the engine, and then turned the rest of the flight over to him. He had nothing but praise during the flight. I hope he is now convinced that the Mark IV is second to none, not only in the air, but also ground handling. (He previously gave us an A- for ground handling, without ever having taxied the Cozy Mark IV.)

We left Arlington on Sunday morning, the last day of the fly-in. Again, the weather was perfect! It was severe clear over the Cascades, the Columbia River valley, Spokane, Mullan Pass (through the Rockies), and on to our favorite stop, Miles City, Montana. We made record time cruising over 200 mph and with a good tail wind. The next morning, when we were all set to leave at Miles City, I started the engine and it shook like crazy! I shut it down, got out, and there was fuel streaming from the cowling. I took the cowlings off, and the fuel was coming out of the Ellison. We had visions of being stuck in Miles City for days while we sent the throttle body back to Ellison for overhaul. We called Ben Ellison. He said the problem probably was due to a particle of dirt stuck under the ball-valve, from my revamping all of the fuel lines when I changed engines. He said to disconnect to air-flow sensing line to the pressure diaphram and blow through it with the electric fuel pump operating. We did that, and presto, the problem was solved. The whole sequence caused us only about an hour's delay. It was on then to the Twin Cities. That's when we ran into the bad weather. We had to skirt thunderstorms to get into South St. Paul. We spent the next 2 weeks visiting relatives, children and grandchildren in Minnesota. One of the highlights was baby-sitting, house-sitting, and dog-sitting in New Prague, MN, and delivering 5 German wire-haired pointer puppies while our son and daughter-in-law were away on a trip.

The weather in the mid-west was iffy all the while we were in Minnesota, and also when we left for Oshkosh on Monday, July 29th. We set up our exhibit at the south entrance to the north exhibition building, same place as last year, and had a very busy week. It seemed like half of the people at Oshkosh wanted to sit in our airplane! We sold all of the plans we brought with us and took orders for more when those were gone.

Jim Patton, our test pilot, gave a forum on his work at NASA doing stall-spin testing of various factory-built aircraft, and also talked about the deep stall problem of the Velocity, and his flight tests of both the Velocity and the Cozy Mark IV, and showed a video of our flight tests. We invited him to attend our forum on Friday (which was well-attended) to answer questions on our flight test program.

The Cozy banquet was at the Ramada Inn (new location) on Friday night. It was a buffet, and the food was plentiful and very good. Thank you Pershings for arranging it! 110 builders and friends attended. We honored Vance Atkinson, who has over 1000 hours on his Cozy, and Todd Morgan, Chris Esselstyn, and Walt Suminski, each of whom have over 500 hours on their Cozys. Cozy builder Lon Cooper, who made beautiful Cozy trophies for us 4 years in a row, and who made Cozy models for our builders years ago, made medallions to award to these builders. Gold for 1000 hours and silver for 500 hours. The medallions were Vance's idea originally, and designed to be mounted on the side of the headrest. They are engraved with a picture of the Cozy and either 500 or 1000 in the background.

We plan to continue presenting these awards to builders who have accumulated first 500, and then 1000 flight hours on their Cozys. We would like to do it in person at the banquets at one of the major fly-ins we attend, but you will have to let us know ahead of time so we can make the arrangements.

The speaker at the Oshkosh banquet was Wm. Fox, who played a major role in the design of the SR-71 Blackbird. He was a very entertaining speaker. It was fascinating to learn of the high technology involved in the design of this mach 3+ aircraft. All this was done in the 60s, and it still hasn't been surpassed to this day.

Moving the Cozy banquet to Friday evening allowed all the Cozy people to attend the picnic on Saturday, another popular event.

We were visited at our exhibit by two representatives of PZL in Poland. Only one, Mr. Bak, Marketing Manager, spoke English. The other gentleman was a technical representative. We discussed the Franklin installation in the Cozy Mark IV. They said that my engine as shipped was set up for the installation of a constant speed propeller, and there were a couple of things I needed to do to convert it for a fixed pitch prop, which might have something to do with the oil leaks I was experiencing. They said they would supply me with the necessary parts and instructions upon their return to Poland. I was pleased to now have a direct contact with PZL, should I ever have the need.

We counted 3 Cozy Mark IVs and at least 11 Cozy IIIs at Oshkosh. They weren't all there at the same time, and at least one (the Siminski's) was parked in the airplane camping area. The judges spent a lot of time looking at the Cozys parked on the flight line and we found out why on awards night. Tim Merrill's Cozy Mark IV won the Grand Champion Plans Built award. This was the second year in a row that a Cozy won this award. Last year it was Todd Morgan's Cozy III. Frank Bibbee won the Outstanding Workmanship award for his Cozy Mark IV, and David Gray won the Outstanding Workmanship award for his Cozy III. We don't know of another design which took as many awards, and we feel very honored to have such good builders building Cozys. Congratulations to the above award winners, and congratulations to all of the rest of you who build very good airplanes and win awards, praise and envy at your local fly-ins.

The funniest thing I thought happened at Oshkosh was when a distinguished man stood looking at our Mark IV, and said, "This airplane looks pretty small for a 4-place!" And Shirley immediately replied, "What do you want to do, stand up and walk around?" Both laughed and apologized to each other.

It was a very memorable Oshkosh that we left on Thursday, August 8th. The weather was pretty good flying back, except for 32 knot headwinds. We got a good start, landed at Goodland, Kansas to refuel, and decided to try to make it all the rest of the way. We cleared the Rockies at La Vita pass and were able to get over the Mogollon Rim country just before the thunderstorms closed in, and landed at Falcon Field, Mesa, about 1:30 pm. The end of a long, 1+ month trip. What a wonderful airplane and reliable engine!

UP-DATE ON THE FRANKLIN

The most frequently asked question on our trip was whether we were going to approve the Franklin engine for Cozy Mark IV builders. We have about 35 hours on the engine now, and it has been very

reliable and smooth-running. It is about the weight and a little more horsepower than the IO-360 Lycoming, but because it is 6-cylinder and smooth-running, it does not subject the prop and prop hub extension to the same amount of stress, nor the airframe to as much vibration. The fuel efficiency seems to be about the same as the 0-360 Lycoming, and we can cruise at a higher speed. The Workmanship appears to be excellent, and the product support from Atlas Motors has been very good. Of course the cost is significantly less than the OEM price of the 0-360. Although we were originally opposed to anything heavier than an 0-360 Lycoming, the Franklin does have some advantages over the IO-360, and for those builders who intend to load up the front seat to the 400 lb. maximum, the heavier Franklin would offset some of the front seat weight and allow these builders to fly at a more favorable c.g.

We have experienced some minor glitches, such as oil leaks, but we expect to chase all of these down and solve them eventually. If we had any reservations about approving the Franklin, it has been that we did not believe we had optimized the installation as yet. Optimization of the Franklin installation has been more difficult than the Lycoming for a couple of reasons. First of all, the Franklin does not lend itself as easily to up-draft cooling because there are more interferences to airflow below the engine--the bed-type mount, the intake and exhaust manifolds, and the push rod tubes, and because of the 6 cylinders, it is more difficult to balance the airflow equally to all cylinders--but we are making progress. Another problem has been the location of the carburetor (throttle body) right below the accessory case and right up against the firewall. In a tractor installation, this would be ideal--plenty of room for a filter/ heat box, but in a pusher installation with updraft cooling, it is less than ideal. We designed three different filter/heat boxes. The first two blocked too much air coming in the NACA scoop and compromised cylinder cooling. Our third design tucks the air filter underneath the oil sump and works the best. On our trip we had a rather small air filter, and thought it might be too much of a restriction in the induction system. After our return we installed a larger filter, which didn't result in any apparent increase in rpm, but will not plug as quickly.

The operating manual for the Franklin lists the maximum cylinder head temperature at 392 deg. F, as measured with a bayonet thermocouple installed in the receptacle at the top of the cylinder, with down draft cooling. With downdraft cooling, the top of the cylinder is the coolest side, but with updraft cooling, the top of the cylinder is the hottest side, so we figured we could raise the maximum CHT for our installation, but how much?

RAF studied cylinder temperature measurement and temperature distribution for the Lycoming engine and reported on it in CP 47, p.10. They (actually one of their builders) installed washer thermocouples under both the top and bottom spark plugs of each cylinder and found that the average difference in temperature across the cylinders was 40 deg. F with a rich mixture in climb, and was about 70 deg. F with a lean mixture in cruise (the lower differential with a rich mixture is due to the excess fuel contributing to the cooling). They also discovered that the temperature measured with a washer thermocouple under a spark plug was 30 to 40 deg F higher than that measured with a bayonet thermocouple adjacent to the sparkplug. So, the maximum CHT stated by the engine manufacturer applies only if the temperature is measured in the same way, and with the same direction of cooling airflow. If the data obtained on the Lycoming applies equally to the Franklin (we plan to make our own measurements), the maximum CHT with updraft cooling should be 432 deg. F in climb measured with a bayonet TC and 472 deg. F measured with a washer TC under a plug, but we need to verify this.

When we first flew the Franklin, the middle cylinders ran as much as 70 deg. hotter than the ones on either end. Actually, a 70 deg. temperature difference (or more) between cylinders is said to be fairly common in factory built airplanes. But in the hot weather here in Arizona, we had to limit our rate of

climb to keep the middle cylinders from exceeding 432 deg. F. The situation improved somewhat as the break in process proceeded, but we still weren't comfortable with our CHTs all during our 1 month trip. The good news is that after returning from our trip, we have had a break-through. We decided that maybe our cowling outlet wasn't large enough, and it was restricting the cooling air flow, so we decided to bite the bullet and start modifying the top cowling. Those of you who saw N14CZ at either Arlington or Oshkosh probably noticed the little pimple on the pilot side cylinder blister to provide clearance for the top spark plug on the last cylinder. This was necessary because the cowlings were contoured for the 4-cylinder Lycoming, and were quite tight for a 6--cylinder engine. Well, after returning, we cut the pimple away and let the spark plug stick out the top of the cowling. Then we cut pretty large slots over the middle cylinders and built reverse scoops for the air to exit the top of the cowling. This resulted in an immediate reduction in cylinder temperatures, but the scoops and plug sticking out were not very esthetic, so the next step was to re-contour the cylinder blisters to provide more clearance between the cowling and the end cylinders. The re-contoured cylinder blisters eliminated the need for slots, and actually look more esthetically pleasing than before. The highest CHTs in cruise are now down to 370 deg. F or below (well under the maximum of 432 deg. F), and by directing the cooling air, the differential between cylinders is now approximately 20 deg. F (compared to 70 deg. F originally). We are much relieved that cylinder cooling, which was our major concern, is no longer a problem.

Oil cooling has undergone a number of changes. We started out hoping that a 9-row oil cooler would do the job, and that we could hide it in the bottom cowling, aft of the strake. On our first fight, we had excessively high oil temperatures, so we substituted a 13-row cooler. There wasn't enough improvement, so the next step was to install a reverse scoop in the bottom cowling to pull more air through the cooler. This still wasn't good enough, and was using cowling air at a time when we were still having problems with CHTs. So we then switched to a separate forward facing scoop in the bottom cowling (sort of like the so called arm-pit scoops) dedicated solely to the oil cooler, with the air exiting out of the top of the cowling aft of the strake. This brought oil temperatures in high-speed cruise down to the 180 - 200 deg. F range, which was darn good, but we knew that the additional scoop caused more drag. We have always been proud of the fact that we didn't have all kinds of scoops hanging down underneath the airplane, which is the reason the Cozy has such a low drag profile. So now that the CHTs are well under control, we decided to try to get rid of the extra scoop and use cowling air for the oil cooler. We relocated the cooler on the firewall, same as for the Lycoming, and exiting out the top of the cowling. We didn't do this originally, because the Franklin is much closer to the firewall, and there was barely enough room to install the 13-row cooler, and we didn't know if it would get enough air flow. We were able to squeeze it in, however, and as of this writing, we have made two flight tests, and oil temperature is just a little over 200 deg. F in cruise, which isn't bad considering that we are taking the measurement in the oil sump, where the oil is the hottest, and also, this is still the hot time of the year here in Arizona. We anticipate that the oil temperature will be a little lower after summer is over. It looks like the location on the firewall will work just fine, and has the added advantage of cooling the accessory case. We have removed the extra scoop underneath the strake, and removed that source of drag.

We have been using the same propeller on the Franklin as we had on the 0-360 Lycoming. It is a 3-bladed, "Performance" prop 64" dia x 76 deg. pitch with 230 sq. in. blade area. On the Franklin, we get about the same static rpm (2400) and consequently the same take off performance, because we are lower on the torque curve, but we can now turn the same prop to a higher rpm with full throttle at altitude, compared to the Lycoming. We were not too interested in testing top speed until we got the cooling under control and got rid of the drag of the extra scoop. Now it appears we can turn at least 2900 rpm at altitude for around 230 mph TAS. Not bad, for fixed gear! We are considering a prop with a little more pitch, so we can use full throttle without exceeding the 2800 rated rpm, if it will not compromise our

take off performance. We might even be able to squeeze out a little more top speed.

We had a concern that with a 3-bladed prop and a 6 cylinder engine, we would not be able to keep all of the blades out of the exhaust stream, and the prop blades might not be able to withstand the hot exhaust. This turned out not to be a problem. As a matter of fact, we are depositing much less soot and lead on the prop than we did with the Lycoming.

Now that cooling is well under control, we can concentrate on some minor problems, like the pesky oil leaks which have been bugging me. At first I thought the oil might be coming from the breather, so I relocated the breather to exit underneath the cowling at the firewall. This eliminated the breather as a possible source. It now looks like some of the oil might be coming from the crankshaft seal, and some from another source, still to be determined. We have been waiting until we were satisfied with the installation before doing our final weight and balance. We are still carrying a little extra ballast in the nose, which we may decide to trade for the electric nose-lift mechanism that Steve Wright has asked us to test. Once all of this has been accomplished to our satisfaction, and we don't have any reservation about approving the Franklin for the Mark IV, we plan to make engine mounts, cowlings, prop hubs, baffle drawings, filter/heat box drawings, and installation instructions available. Although it has been a 'long haul', we are quite pleased with our progress to date. In college, if you knew ahead of time how a laboratory experiment was supposed to turn out, and wrote up the results without having actually done the experiment, it was called 'dry labbing'. If you didn't get caught, it saved a lot of work. Back in April we were confident we had everything figured out ahead of time and that the Franklin installation would go like clockwork. We could have recommended an installation without having actually tried it ourselves (dry labbed it), but that isn't the way we operate. We ran into a lot of things we didn't anticipate. This is a good example of why it is necessary to "prove" any new design or even modification before recommending it to builders. Good luck to the Speed Queen folks who say its not necessary for them to prove their pre-fab kit canard design before selling it to builders, because it is 'based on existing technology''. It will be interesting to see what kind of problems their builders have.

OTHER ENGINE OPTIONS

There are at least three Cozy Mark IVs flying with IO-360 Lycoming engines (Doug Koster, Chuck Wolcott and Frank Bibbee). Tim Merrill's Grand Champion Plans Built Cozy Mark IV is very interesting because it has a 160 hp 0-320 Lycoming with a Hoffman constant speed prop. It is a more expensive option, but reportedly has super performance. It can develop full power (160 hp) for take off by turning up to rated rpm and then cruise at full throttle at high manifold pressure but lower rpm. Its performance might actually be better than the 0-360. Note- Wayne Lanza (561) 664-9239 has a line on some surplus MT 3-bladed constant speed props designed for the O-320 Lycoming engine which can be purchased for about 1/3 of the original cost.

We understand that Larry Olson, in Florida, has a highly modified Mark IV, in which he first installed a Mazda 13B auto engine. After spending more than $7,000, he still wasn't satisfied with it, scrapped the Mazda and switched to a Franklin. We invited him to write up his experiences for us to publish for the benefit of other builders, but he did not seem to want to share his experiences, at least with us. He can be reached at (404) 779-9477. We would be pleased to report any news, even if second hand.

We know of at least one builder who is planning to install an IO-540 Lycoming and have heard of a

couple of builders who are planning to install Subaru auto engines. Even though we have argued against these choices, we hope that these builders will make an honest, objective evaluation and submit it to us for publication for the benefit of other builders, as we are doing with the Franklin. Also, we would caution first-time builders, don't be influenced by people who speak in glowing terms about what they are going to do. We know from our own personal experience and also that of others that developing a new engine installation is much more complicated than it seems at first; it is very time consuming and expensive, and a successful outcome is far from guaranteed. Let someone else spend the time and money and take the risk. If it is successful, proven to be reliable after 50 to 100 trouble-free hours, doesn't cause a c.g. problem, you see it and like what you see, it doesn't depreciate the value of the airplane, and they are willing to supply cowlings, engine mounts, baffling, speed reduction units, water cooling systems, instructions, etc., then consider it. Otherwise, stick with what has been tried and proven.

OKCGIG 96

We neglected to mention it in our last newsletter, but at this canard fly-in, Oklahoma City "Grazin' in the Grass", which is held every year in June, Frank Bibbee's Cozy Mark IV, N68TF won the award for Best Interior and also Best Overall. Frank also built his Mark IV in 18 months! Congratulations, Frank, we are all proud of you!

PUBLICITY

We have been monitoring both Sport Aviation or Kitplanes the last 3 months for pictures of Cozys, and found only one. It was Tim Merrill's Cozy Mark IV in the Oct. '96 issue of Kitplanes. Hope we haven't missed any others. Tim will get a complimentary renewal of his newsletter. We need more of you to send in write-ups and pictures of your finished Cozys to both Kitplanes and Sport Aviation. It doesn't matter if you have just finished, or have been flying for a few years. SEND IN THOSE PICTURES!

As a result of our stopping in at Grass Valley, CA, on our way to Chino, for a photo shoot, Norm Goyer wrote a very nice article on the Cozy Mark IV which was published in July '96 Sport Pilot magazine.

Also, the Oct.'96 issue of U.S. Aviator featured the Mark IV on the cover and Jim Campbell commented on his flight at Arlington with our new Franklin installation, and printed a few pictures.

FIRST FLIGHTS

Cozy builder Clyde Rutledge called to report that Randy Schoonover, Gaithersburg MD, completed his 3-place Cozy and his first flight was on 8/26/96. Brian Heinitz, in Citrus Heights, CA, has completed his Cozy and it is at the airport, ready to fly. We also understand that both Val DeOliveira, in S. Floral Park, NY, and Pat Young, in Pueblo, CO have completed their Cozy Mark IVs, and they are at their respective airports, ready to fly.

PEEL STRENGTH

The peel strength of a cured fiberglass matrix is the amount of force required to delaminate a layer of fiberglass from the layer below or the substrate below. It is the measure of the internal strength of the cured epoxy or its adhesion or mechanical bond to the substrate. It is a very important property, because the peel strength of the epoxy is literally what is holding your airplane together.

It should be obvious that when you are making a layup over a dry, previously cured surface, the peel strength will be either the strength of the mechanical bond, or else the internal strength of the epoxy, which ever is weaker. It is important, therefore, in making a wet layup over a dry surface to properly prepare the dry surface so the mechanical bond to the surface will not be the weakest link. There are two methods of preparing a fiberglass surface for the maximum strength mechanical bond. The first is to sand a previously cured fiberglass surface dull with 36 grit sandpaper. The disadvantage of this method is that if the surface is not absolutely flat, it is nearly impossible to remove all of the shine without sanding through some of the glass filaments, weakening the substrate . The second method is to squeegee peel ply over a fiberglass substrate before it cures, and strip it off after cure. The advantage of using peel ply is that the shiny surface (which might also be waxy) is stripped off with the peel ply, and the surface remaining is flat but fractured and rough. Sanding this surface is a wise, extra precaution to maximize the mechanical bond.

It is normally assumed that maximum peel strength is obtained by making a wet-on-wet layup, because then there is no mechanical bond involved. There may be an exception, or at least a reservation to this rule. We recently received a call from a builder in the state of Washington who said that he was using Epolite 2427 resin, and he noticed after glassing the inside of his fuselage sides, that the peel strength of the second layer was poor, and he could peel off the second layer rather easily. After discussing his technique with him, we think we know why this happened. Very often, first-time builders are too meticulous, and take a long time to squeegee each layer of glass to remove all of the excess epoxy before laying down the next layer of cloth. The fuselage sides have a lot of area so this could take quite a long time. If, as has been alleged, 2427 is more susceptible to contamination by humidity (and/or carbon dioxide) in the atmosphere, and it is exposed to the atmosphere for a long period of time before the next layer of glass is applied, there could be a contaminated surface between the two layers of glass which would reduce the internal strength of the epoxy at the worst possible location -- between the glass layers.

Experienced builders have learned that it is much faster, and results in better layups, to wet out the first layer of glass, squeegee the air out, but leave an excess of epoxy and then lay down the next layer of cloth on top to soak up the excess. This wets out the second layer faster, because the excess epoxy from underneath pushes the air out ahead of it. This saves much time, results in less air in the layup, requires less squeegeeing, and, if the epoxy is susceptible to contamination from the atmosphere, there is much less exposure to the atmosphere, and any contaminated surface epoxy does not end up being between two layers of glass. The same considerations apply also and argue for the use of peel ply over the top layer.

We have tested the peel strength of Epolite 2427, and haven't found it to be any different from the several other epoxy systems we have used. It is true that we have low humidities in Arizona most of the

year (not during the monsoon season, however), but it is also true we follow the procedure for faster and better layups recommended above.

HARD SHELLING

We understand that one of the hot subjects on Internet lately has been "hard shelling". Some builders think this is a new idea, and the best one since "sliced bread". They say you should micro the wing cores, let the micro cure, and then spline sand the cores before glassing. They claim this is the best and fastest way to get perfectly straight wings.

Actually, this is not a new idea. I can remember it being discussed in the late '70s, by Varieze builders, and as I recall, Burt Rutan thought it was a very bad idea, with which I happen to concur. First of all, if you do a good job of cutting the cores, or purchase professionally cut cores from Featherlite, very little sanding should be required--just enough to remove the hairs which result from hot wire cutting. Even if you have to do some straightening, it is a lot easier to sand plain styrofoam than a cured, microed surface. Of course, you need to avoid hard glue joints, or undercut any which would interfere with sanding. Secondly, "hard shelling" takes more time, because you have to sand and vacuum the cores first anyway, before applying micro, and then wait a day or more for it to cure, and then you would have to sand and vacuum them again, before glassing. The second sanding is bound to take a lot more time, because the is harder, and there will probably be excess micro that has to be removed. Thirdly, and worst, you will end up with poorer peel strength, because you will be relying on a mechanical bond to a flat, cured micro surface rather than a chemical/mechanical bond of epoxy to foam, involving a lot more surface area, as with a wet layup over wet micro, as specified in the construction manual. Why do you need peel strength in your wings? Because the top skin is in compression, and the thing that keeps it from buckling is the peel strength! Burt Rutan had a hard and fast rule not to glass over a cured, microed surface, if structural strength was required, because the mechanical bond to micro is poor and the internal strength of micro is poor (that is why you use flox for outside corners).

After all, Burt Rutan was the one who developed and perfected the moldless composite technology, did exhaustive testing, designed, built, and tested countless composite airplanes, and is the recognized authority on composite construction. As far as I am concerned, when I am putting my own life on the line, I would rather put my faith in Burt Rutan than the questionable sources on Internet. And, as far as diluting micro with a solvent before applying it to foam-- this is also very bad practice! Don't! Perhaps it bears repeating. The Mark IV we designed, built, tested, and exhibit at airshows was built as exactly as we possibly could according to the plans and instructions we have published. If you choose to build yours some other way, consider it to be untested, and you are on your own. Nuff sed!

COPPER STATE FLY-IN

The Copper State Fly-in is scheduled this year for October 10 to the 13th at Williams Gateway Airport in Mesa, only about 10 miles away from our home. Formerly Williams AFB, this airport has three 1,000 ft runways and better ramp facilities than any other major fly-in. It gets larger each year, and we hope it will rival Arlington and Sun 'n Fun. We plan to have our airplane in an outside exhibit area and have scheduled a forum. We have sleeping accommodations in our home and can put up several couples (on a

first come, first serve basis). Last year we reserved a banquet room on Friday night at the Red Mountain Steak House, and 31 people attended. The steaks were delicious (and reasonable), and everyone had a very good time. We have reserved a banquet room again this year on Friday, at 6 PM. We have two cars, one of which is a van, so we can provide some transportation. We would appreciate hearing from you, if you need a place to stay and plan to attend the banquet.

MARK IV CHANGES/CORRECTIONS

BUILDER HINTS

Thomas Kennedy sent in these hints:

1. A small propane heater worked well in my shop when it was cold out.

2. Be careful in laying out VOR antennas on the bottom of the fuselage to avoid future cut outs for the landing light and nose wheel.

3. Chap. 9, p.2: a 1.5 in. wide vinyl strip from the hardware store covered with box sealing tape gave me a very controllable, straight trailing edge line for my strut layups around the soda straws. Before starting the layup, I placed peel ply against the strip so as to reduce sanding later on. This worked very well.

4. Chap 5, p.5, Fig. 15 & 16: I found that it would be better to have the electrical cover transition ramp up closer to LWX. This would provide more clearance when shaping the outside of the fuselage in Chap. 7, Step 2.

5. Chap. 6, p.2, Fig.8: The 4-ply layup shown is what you ultimately want. Suggest that you make it wider by an inch so that when you trim the canard cut-out away (Chap. 7, p-4, step 6) you are left with a nice clean edge through a uniform built-up area.

6. Chap. 6, p.5: You may want to consider running a channel for future electrical routing down the back of the triangular seatback support.

COZY BUILDERS HOSPITALITY LIST

Barbara Pershing publishes a "Cozy Builders Hospitality List". This is a list of Cozy people who are willing to extend their hospitality to other traveling Cozy people. The list is not to be used for commercial purposes. If you wish be on this list and to receive the most recent edition, please send any special comments and $2.00 (to cover printing and mailing costs) to Barbara Pershing, 8134 Buckridge Rd., Cedar Falls, IA 50613.

FOR SALE

1. Featherlite main landing gear strut for 3-place Cozy or Long EZ, $300 delivered in the US. (507) 437-6622.

2. Cozy builder, Bill Walsh, has arranged a source of tee shirts (sweatshirts available on request) which come in various colors but only adult sizes. They have a detailed picture of the Cozy or Cozy Mk IV. The Cozy name is printed above. Bill is also working on other Cozy items, such as jackets, caps, pins, and cups. The shirts are available at $9.95 plus $1.50 shipping and handling. Orders for 2 or more are sent 2-day priority. Make checks out to Linda Walsh, PO Box 160884, Altamonte Springs FL 32716. (407) 695-3543.

3. Wayne Lanza makes a number of very nice goodies for the 3 and 4-place Cozys. He has an electric speed brake actuator kit with all the parts needed for installation, with instructions for $275. His latest creation is a switching and breaker panel for the Mark IV. It is similar, but not identical to the one we had made for our plans model. It is located at the top of the panel, which is the best location for appearance and access to the electrical system. Wayne is using the highest quality DC switches (they are hard to locate) and circuit breakers, and pre-wires the panels, making the rest of the electrical system installation very EZ. Cost is $425. We really appreciate Wayne's contribution, and heartily recommend his products to you. Contact him at: 9425 Honeysuckle Dr., Sebastian, FL 32976 (561)664-9239.

4. We believe that the 4-pipe stainless steel exhaust system we designed and is being manufactured by Custom Aircraft Parts (see 'Authorized Suppliers') is far superior to anything else available or advertised for the 3 and 4 place Cozy (or Long EZ, or any other pusher, for that matter). Cost is $500, which includes shipping and handling.

5. New, improved fuel sight gauges. Clear bubble with white background. $35 per set. Vance Atkinson, 3604 Willomet Ct., Bedford, TX 76021-2431 (817) 354-8064.

6. Dr. Curtis Smith's nosegear ratchet (which we recommend) is now priced at $40. Dr. Smith's new address is 1846 Sextant Drive, Worden, IL 62907-9631 (618) 656-8209.

7. IO-360 Lycoming 180 hp. 1100 hrs. $6,000. Frank Crook (541) 347-2022.

8. IO-360 A1A Lycoming 200 hp. OSMO. $12,000 (602) 497-2365 after 6 PM mountain time.

9. Nearly complete 3-place Cozy. Left are wiring, paint and upholstery. Includes Kevlar cowlings and wheel pants. Built by experienced composite builder who has decided to switch to a Cozy Mark IV. Price reduced from $16,800 to $12,800. Will also part out as follows:

    - Fuselage: Controls installed, canopy hinged, Featherlite turtle deck on, firewall ready to attach engine, gear, brake pedals, cylinders in nose retract step $7,500

    - Wings: Big rudders, hidden belcranks, installed with com antennas, strobe ready $1,600.

- Canard: Roncz/Atkinson canard with dihedral complete with elevators $ 1,100.
- Center spar: Drilled to wings $1,000.
- Strake L.E.: With rigs and bulkheads, Kevlar $450.
- Cowlings: Featherlite, Kevlar $400
- Main gear: Axles aligned, heavy duty wheels and brakes, tires, tubes and Kevlar wheel pants $550. Alan McPherson, Stewarts Point, CA (707) 785-2947. Call after Oct. 26, 1996.

LETTERS FROM BUILDERS

8/28/96
Dear Nat and Shirley,

I'm not a letter writer but under the circumstances I felt a letter was needed. I wish to thank Shirley for the help she gave me at Oshkosh this year. I was at your exhibit talking to Shirley, telling her how my search for an engine was going nowhere when she told me about a posting for an 0-360 (on the bulletin board at the red barn). The posting said the engine was new and still in the box. The posted price was $18,000 OBO. Shirley said it looked like it might be a good deal. Well, I didn't have the $18,000, but why not make an offer?

Attached you will find pictures of that brand new 0-36OA3A on my trailer in my back yard. I drove 1,600 miles to get it and paid nowhere near the posted asking price. The former owner (name removed from the box to protect the foolish) had money, and after purchasing an airplane kit and new engine, found he was not a builder. When I arrived, the engine was 2 1/2 years old and the banding on the box had never been broken.

I still have to look at it daily to know it's really here. Without Shirley's help I would still be looking.

Thank you Shirley for the sharp eye and helpful hint.

For all of you other builders, keep looking and when the opportunity opens up to make an offer, give it a shot. You never know what you may end up with! Thank you Shirley!

Jon Staben
Freeport, IL

8/25/96
Dear Nat,

My project is coming along fine but not as fast as I would like. It is my hobby and I enjoy it very much.

The problem is lack of time, patience, and the necessity to work in order to pay for everything. The project is not that expensive relative to the end result and other 4-place airplanes, but one does have to pay the piper now and then to keep things moving along. And takes time away from the work shop.

For those just getting started - here is one very important tip. Exercise patience and spend time on foam preparation before glassing any piece. Time spent here is paid back at least 4-fold when it comes to finish work. I was very impatient early on to get the project under way and am now spending an inordinate amount of time in the finishing process. I had all the major components completed in less than 800 hours. All measurements are right on and weights are in the ball park as near as I can tell, but I've been filling and sanding for 8 months and am still not at all satisfied with the result. As an example of what I mean, one spar cap has a .2" hump that is driving me nuts. I'm having to fill in both directions to get rid of it. This could have been prevented by more diligence before glassing that wing.

On another subject, Nat, one question. The main gear strut cover under the fuselage in the air intake area is a potentially dangerous situation, in my opinion. The .25' metal slugs glassed into the fore and aft gear attach bulkheads as screw anchors have no built in locking capability after being drilled and taped, and do not seem adequate to attach the cover. It's the worst place on the airplane to have a screw come loose. It will go through the prop or into the engine compartment. Locktite might work to hold the screws but can one depend on it in such a critical area? I am seriously thinking of installing the cover permanently with flox and glass to avoid a problem down the road. The main gear strut attach points can be adequately inspected from above. Nat, the long EZ did not have such a cover. Is it really necessary on the MKIV?

Sincerely
Dave Domeier
Chesterfield, MO

Editor: *No, the cover is not necessary, but considered a nice touch so that it would not be necessary to cut away the bottom of the fuselage if it ever became necessary to remove the gear. In the prototype, I installed nutplates, but considered it too difficult to require of builders. With the plans model I now have over 300 hours in 4 years, and never found any of the screws to have loosened. Perhaps checking them every annual inspection would be appropriate, and if any loosening is found, install them with locktite.*

8/26/96
Dear Nat,

Cozy plans #349 is nearing completion. I still have to wrestle with engine installation and then the finishing and final painting. Will keep you posted.

Sincerely,
Barry Audain
Puerto Rico

Aug 15, 1996
Dear Nat,

My grandchildren are at the Zoo this morning, I am free for a little while to write to you some things I wanted to express. I received the owners manual in time before my return to France, many thanks to

have reacted so fast.

My Long EZ is flying very well, I already flew twice in Africa direct from France over Spain with her. But my family with 9 grandchildren is putting pressure on me to build a 4 place. Moreover I want to go back to Africa, and my Long EZ appears too slow and has no room to travel extensively. So I went to Oshkosh to choose what to build and I saw very nice aircraft and did a lot of comparisons during three days to make up my mind. Finally my decision was reached on Saturday when I saw a bunch of people sitting around you on the ground near by your Cozy and listening to questions and answers.

I could not participate in the discussions because of the language barrier, but I understood that you all were interested in flying well. I could not get all that was said around you but that making money was not the main aim as it turned out to be when I discussed with the designers of the other aircraft I was interested in. I am sure that with you something is going to happen to me in understanding things of aviation during the adventure of building a 4 place.

This was confirmed when I read the newsletters I found in the envelope you passed on to me Sunday morning. Please Nat go on this way I shall follow you with great pleasure. I had not paper to note a certain number of informations you gave me on the German variable pitch propeller it is possible to equip the Cozy MK IV with. I am going to call you to have the name of the German manufacturer of the propeller. My intention is to aim at the lightest aircraft with the most powerful engine possible according the French regulation (maximum of 200 hp) in order to be as fast and light as possible and get the fantastic pleasure of flying a high light efficient aircraft.

Sincerely, Bernard Cannac
France

Aug. 10, 1996
Dear Nat and Shirley,

My Cozy MK IV is coming along slowly, but nevertheless moving forward. I've just started the strakes, which is my last large airframe project. I should be ready for engine installation this winter, that is, if I can find something I can afford. Boy, the prices of engines is staggering!

I will be in Europe in October, and am tentatively planning to visit the PZL company. I'm very interested in the work you're doing, and who knows, maybe I can swing a super deal on a new engine.

Thanks
Steve Cornelius
Rochester, MN

Aug. 8, 1996
Dear Nat,

This is a good opportunity to put my money where my mouth is to show my appreciation and support for your research into the Franklin engine scheme. Please accept the enclosed check as a small grant to continue your investigation and research. THANKS!

Best regards,
Thomas Kennedy
Aliso Viejo, CA

Editor *Thank you Thomas. My motivation is helping builders. I will continue as long as it is appreciated.*

Aug. 1, 1996
Dear Nat,

Building a Cozy Mark IV is inevitable. My father and I built Varieze N75EZ in 1982. Since then, I have become a materials engineer using a lot of Burt's philosophy designing the first all carbon fiber roller coaster for Walt Disney here in Orlando. Learning and working in composites and engineering materials so much for other people is driving me crazy not to have a project for myself. Dad still putters around in N75EZ, and I'm too old to ask Dad for the keys. I like what you have done with this canard pusher. Tell me what the lightest plans built Mark IV is and I'll beat it. So sign me up.

Sincerely,
Ken Sargent
Orlando, FL

Editor: *I think Dave Higgins beat my empty weight of 1050 lbs. by 30 lbs.*

Aug. 5, 1996
Dear Nat,

Enjoyed meeting you Aug. 3rd at Oshkosh. It was my first visit to the EAA airshow and I had a ball. I suppose I'm typical of many who think of building a kit plane, as I'll be retiring in the next year or two, former pilot, architect, and handy with tools. I was very impressed with your Mark IV and am enclosing a check for the info kit. I hope to send for plans before the end of 1996.

Very truly yours,
Italo Milani
Highland Park IL

April 7,1996
Dear Nat & Shirley,

There is not much to say about MK IV#220. I have been constantly on the road for the last few years so building time has been very limited. All aluminum "do it yourself" parts are finished, and the plans have been read 1000 times. I decided to stall the building (cloth, foam and epoxy) until my working week is reduced to 60 hours, but to continue the procurement process.

In 1995 I was in the US 6 times, and every time I brought an extra suitcase and faxed orders to Wicks or Brock to be delivered to my hotel, so now, I have a complete kit (without epoxy), which I have been carrying back to Denmark.

In November I was in LA on my way to Edwards AFB so I stopped by Brocks and Spruce to pick up stuff and look at their facilities. Both places showed great hospitality when they heard that I came all the way from Denmark.

In December I got transferred to a new job, at Ministry of Defense, a desk job, 9 to 5 and no traveling. This means that we have to move to the outskirts of Copenhagen. In connection with our new house, there is a 648 sq ft garage, so now there is no more excuses not to build. The movement also means that I will be a lot closer to two other Cozy builders in Denmark, so it will be a lot easier to obtain help if needed.

Michael Schroeder
Askevej 34, DK-3630 Jaegerspris, Denmark. +45 40597739

Aug. 10, 1996
Dear Nat,

Thank you for sending the Cozy MK IV plans. They are great! I've read through them twice and posted the changes from all the newsletters. Its great to get Information and news from other builders and I can really see why building a Cozy IV is the right choice.

Getting materials in the Netherlands is a bit difficult, especially epoxy hardener. I've found a company in France which will process orders to Wicks and Aircraft Spruce has an office in England, but Wicks won't ship any type of hardener. S&S has Safe-T-Poxy II but says they can't get Epolite 2427.

I contacted the Fiber Resins Group to get material safety data sheets (MSDS) for 2427. The MSDS is the US method of tracking hazardous material for shipment. Any material which contains some portion of a registered chemical must have an MSDS sheet so it can be tracked from cradle to grave. The 2427 hardener MSDS indicates that it doesn't require special handling for transport, so now I'm trying to find a shipper who understands the MSDS enough to get it here for me. I now have a garage and shop next to my house so my wife will always know where to find me. Space is a premium here and it would scare you folks in the US to find out how much just renting working space was costing me. I have my jig table built per the plans and have insulated it well for the cooler Holland weather.

If there are any other builders on this side of the world, we'd love to hear from you. If ever you guys get the itch to make a real long cross-country, we'd love to show you around and extend our hospitality.

Thanks again.
Keith Barr
Kerkhoflaan 110, 1161JE Zwanenburg, The Netherlands,
+31 20 497 4952 (phone)
+31 20 681 2634 (fax)

July 16, 1996
Dear Nat,

Thank you for spending time answering questions about the Cozy MK IV at Arlington. I have spent about a year and a half going back and forth about which plane to build and after finally seeing the Cozy with my own eyes last weekend, the decision was made. Enclosed is a check for the plans.

Thank you.
Giles Sydnor
Seattle, WA

July 14, 1996
Greetings Mr. Puffer,

Thank you again for the time spent with me at the Chino Fly-in this year. Your showing me the details of your airplane inspired me to order plans. How is the Franklin installation progressing? As I mentioned to you, the 0-360 was my engine of choice. I recently received info on the Infinity retractable landing gear with video showing the unit on a Cozy (maybe a MK IV). What is your opinion and/or recommendation on this modification?

Sincerely,
Martin E Orro
Lake Hughes, CA

Editor:*The Infinity gear is not approved for the Cozy for a number of reasons. Also, because of its record, Avemco will not insure an airplane with an Infinity gear.*

July 25, 1996
Dear Nat,

The electric nose lift design has not been frozen yet. We have tested all of the changes made except for one which involves a new manual override system. I am working with Thomson Saginaw Ball Screw Co. to have them build an override crank into the unit as they make it. I have made a commitment to buy 100 of these units so I need to check out the prototype before Thompson makes 100 of them. It will be a week or so after OSH before I have this final revision checked out. I will ship one to you after OSH. I am investing a lot of $ in this so I want to make sure everything works correctly. I think it's going to be a really nice kit.

Steve Wright
Brentwood, TN
(615) 373-8764

April 18,1996
Dear Nat,

Received my plans today, looked over every page and read all the newsletters. I'm very satisfied in the thoroughness. Great Job! We will start our Cozy, we being my wife Christine and I, ASAP, but still have to finish building our 39 ft Gulf Sloop Pilothouse Sailboat. It goes in the water June '96.

Martin "Dutch" Ranck
Oxnard, CA

Aug. 13, 1996

Dear Nat,

By now you and Shirley should be back home from OSH and your usual visit to relatives in MN. I hope all is well. My Cozy, N17IBH sits in my hanger, complete. In short, an FAA signoff and a week of work and I'll be flying. But getting that week has been difficult. In this, my first year at Airborne Express (there are a Cozy builders here!) I have had a very tight schedule, with a lot of time in training, keeping me away from home. But that is changing, so expect a 1st flight report soon.

Now a note on something I feel strongly. Most recent homebuilt accidents have not been the result of design or construction flaws, but rather pilot error. This is due most often to lack of proficiency and/or poor judgment. You can bet the FAA is watching!

In the wake of the Valuejet and TWA 800 accidents, the media frenzy has created a public panic about aviation safety. As a result politicians are pressuring the FAA to 'do something'. When government rushes into face-saving decision-making, it's bad news! The resulting climate of 'cracking down' on perceived "problems" to show how they are "doing something" often creates an oppressive bureaucracy that restricts freedoms.

Therefore, it is more important than ever that we Cozy builders/flyers do our part to fly as safely and incident-free as possible, lest the government 'crack down' and deny or restrict our freedom to create airplanes and fly them. And remember that freedom involves responsibility! As long as we continue to build the best possible quality into our airplanes, develop and share ideas that make our airplanes safer and more capable, and maintain proficiency while exercising good judgment, we can win the confidence of the FAA.

Each of us has strengths and weaknesses. The key is to identify our strengths, and help others in those areas. Then identify our weaknesses and seek help there. In my case, engine work and basic A&P practices are areas where I sought help. Currently, I am using my ability to work in glass to build composite parts for a friend building a GP-4, a wood airplane.

I fly DC-9s for a living. We cruise at 33 to 35 thousand feet at mach .75 to .80. With EFIS, slats, flaps, spoilers, elevator augmentation, hydraulic, pneumatic, and multiple-bussed electrical systems, it is a complex airplane. My simulator training is intensive, with approaches to minimum with engine and system failures. Am I ready to fly a Cozy? No! It has been several years since I've flown a piston single. My background will obviously be helpful, but I still need to prepare those skills specific to flight testing my Cozy.

How will I do that? First, I'll be flying some quality dual, including stalls, spins, and a review of commercial maneuvers. Then, I'll fly with friends in Bonanzas and Cessnas to broaden my practice. Meanwhile, I'm developing checklists and procedures for the Cozy. Then, I'm thinking ahead about how to respond to the unexpected. How somebody else should prepare for their first flight may be quite different. But the key is to prepare yourself, not just the airplane. Plan ahead and use good judgment. If something doesn't feel right, it probably isn't. Finally, shrug off peer pressure. My airport friends are really getting anxious to see me fly. They keep bugging me to get my Cozy into the air. But fly only when you are ready, not when they are ready to watch.

So please be safe. I hope to send in my first flight report soon.

Brian Heinitz
Citrus Heights, CA

[Prev][Next]

[Newsletters]
[Cozy MKIV Information]