

# COZY NEWSLETTER #31 October, 1990

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Cozy builders will need newsletters #4 - #30, and a current subscription to the Cozy newsletter. The earlier issues contain most of the design changes and corrections. Other issues contain building hints, builders' letters, safety recommendations, first flight reports, changes in suppliers, and other information helpful to builders. The newsletter is our principle means of builder support and communication. We also answer telephone calls whenever we are home, and personal letters, but please enclose a stamped, self addressed envelope if you desire a reply. If you have news, suggestions, or experiences of interest to other builders, write to us and we will publish your letter (if it isn't too long).

## OSHKOSH 1990

Another year and another Oshkosh! This year was our 18th in a row. Each year is bigger. The changes have been gradual but steady. There is no way to take in everything. Even reporters have a problem. I, for one, am not too impressed with the heavy iron, the B-2s, Stealth, Concorde, etc. What impresses me more is the sea of homebuilts, which gets larger every year. Clearly, homebuilding is taking over private aviation. The big money seems to be in pre-fab kits, judging from the slick displays and very professional promotion, and the price tags on some are reaching up toward 6 digit

figures. Just think, 13 years ago we built a Varieze for \$7,000, including engine, instruments, and avionics. How far we have come!

This year my usual travel companion, Shirley, went north commercially the 1st of July to lend our daughter a hand. She was expecting later in the month and determined to work (she is a physcian) to the very end. I Stayed behind to mind the store and wait for Lee Parlee (my sister) to arrive. Lee enjoys coming to Arizona during the summer monsoon season to handle our affairs (including looking after Shu Shu, our Lhasa) while we are gone.

After she arrived, Flight Service advised that the 16<sup>th</sup> looked good for VFR across the country, provided I left early, to avoid mid-day build-ups which were predicted. I got up at 3:30 AM, packed, and headed for the airport. It was still pitch black, except for the taxi and runway lights. I wheeled N22CZ out of the hangar and, after some hesitation, taxied out to the runway and took off. In the pre-dawn darkness I could see heavy, black clouds to the east. I headed between layers, and below I could see all but the tips of Four Peaks shrouded in clouds. I thought if Shirley were along, we would be doing a 180, but I pressed on. Soon the sky cleared ahead and the sunrise over the Rim country was spectacular. I made good time and landed at Kearny NE to stretch, check oil, and refuel. The weather, as predicted was good, mostly clear.

My next stop was my destination, St. Paul, MN. I touched down at 2:30 PM local time, after 7 hrs of flying time at an average speed of 180 mph and a fuel burn of 5 gph.

We spent a busy 9 days and were present for the birth of our 8th grandchild (a girl), and then I headed for Oshkosh, again alone.

Upon arrival, I staked out a row for Cozys on the flight line, located our camper in the campgrounds, went into town to pick up our rented van, and then greeted the Wilhelmsons, just arriving.

Over the next couple of days, Cozys arrived, bringing the total to 10. First timers Mike Marshall (variable pitch MT prop), the Steve Russells, the Jerry Lynchs, thc Al Yarmey's the Dennis Oelmans, and the Rex Pershings arrived. We were expecting to see Merle Musson and Lucy, with their new Blanton engine installation, but were told that he had some bad luck and was busy re-installing his Lycoming. All of the Cozys were so beautiful it would have been difficult to pick the best. One or two Velocities tried to encroach, but clearly the Cozys were the center of attention. Even Danny spent quite a bit of time admiring them.

Shirley arrived by car from St. Paul late Thursday, making our group complete. We camped with the Wilhelmsons, Marshalls, and Russells in Paul's Woods.

Saturday night we got together at Robbins for the first annual Cozy dinner. Thc largest room we could reserve was for 25, but 29 squeezed in. A good time was had by all sharing building and flying experiences. Next year we have a room for 50 reserved for Friday evening. We hope you will join us.

The Cozy Forum was on Monday afternoon. Attendance was very good. We were honored to have Uli Wolter there (No, he didn't fly his Cozy over). Uli up-dated us on thc Cosy Classic, and general

news about what's going on outside the US. As is our custom, we also honored first time Cozy pilots, and gave them all a chance to speak.

I talked about the advantages of building an airplane from plans and basic materials (lower cost and control of quality), and cautioned builders about dealing with custom shops. I reviewed what I had learned about automobile engine installations (not very favorable) and then discussed new developments with the Mark IV.

We enjoyed seeing old friends again and meeting new ones on the flight line. By Wednesday, many were leaving, the weather was bright and clear, so we headed back to St. Paul. After a few days of visiting, I headed back home to AZ. Weather was good until approaching the Rockies. We usually stop at Albuquerque, so we can cross the mountains early in the morning the next day. But this time everything was socked in, except for a small hole through La Vita pass, in southern Colorado. I elected to squeeze through, and on the other side there were cumulus and occasionally cumulonimbus. The air became increasingly bumpy and the build ups bigger as the afternoon (and I) progressed. I made it over the Mogollon Rim between thunderstorms and touched down at Falcon field (Mesa) about one hour before the whole sky erupted. I was glad to be back again safely.

A couple of days later I picked up Shirley at the airport and then we said goodbye to Lee. Another Oshkosh was over and it was time to get back to work.

## PLANS FOR THE MARK IV

The announcement at the forum in Oshkosh that we decided we would work up plans for the Mark IV and sell them was greeted with spontaneous applause. Many different factors entered into this decision. It is true that in the spring of 1987, I was feeling burned out and tied down. We had retired and moved to Arizona, but we were working harder than before, what with the move, adding a studio and shop on to our house, landscaping, building another airplane (the prototype Mark IV), and supporting Cozy builders. It was also true that we were concerned about the liability implications in designing and selling plans to a homebuilt aircraft.

Since then, we have had a chance to relax a bit and began to miss being busy and involved. We have also observed that the record of the Cozy has been at least very good, if not perfect, which we attribute to a good design (thanks Burt!), good builders, and good pilots. You, as much as anyone, are responsible for our decision. We have observed other 4-place designs being offered to home builders. They are, for the most part, expensive pre-fab kits which do not offer the stall resistant safety feature, characteristic of Rutan designs and which we copy under license. We know the Mark IV is a superior design and we have been bombarded with requests from potential builders for plans.

We have been flying the Mark IV for two years now, uneventfully, and we know of no changes that would be necessary to improve its safety or reliability in any way. Some people have suggested a little more room, and I have thought of a few things which would make it easier for the average builder to build and even save a few bucks. After all, this is the reason for prototyping a design. To prove it works as expected, to see if there are any ways it could be improved, and to gauge public reaction.

We have announced a target date of Jan. 1, 1991 for plans to be available. In the meantime we will be building the proof of plans model, to finalize the working drawings, getting more photos, preparing all the little detailed sketches, and writing all the detailed instructions. We purchased a new HP LaserJet III printer (have you noticed the difference in this newsletter) and software Windows and Word for Windows for desk top publishing. As of this writing, the new fuselage tub is assembled and sitting upside down in my shop awaiting glassing of the outside. The first two construction chapters are done and we are working on the third. We have set the price of plans at \$500, and agreed to help a limited number of builders get started before Jan. 1. We will have to revise the material list before arriving at a final cost, but \$12,000 is our current estimate, not including engine or avionics.

While wrestling with our decision, we briefly considered whether to turn the entire project over to Uli. However, we couldn't give him anything less than a complete set of plans, which would have to be proofed, which would still require everything we are doing now. Also, it would be difficult for him to provide builder support for a design he had not first built and tested. Furthermore, the main market for a 4-place is in the US, so it didn't seem to be in the best interests of builders to make this arrangement.

We briefly considered entering the Mark IV in Aircraft Spruce's design contest for use with the Buick V-8 engine conversion. We did a little investigation and learned that typical auto engine conversions are costing \$6,000 to \$7,000 installed, even starting with a used engine, so the cost incentive is not there. Also, builders are discovering that the installed weight is substantially more than a Lycoming of equivalent horsepower, and we have heard stories about forced landings and engine fires--things you do not want in any airplane, much less in a 4-place. So we dropped this idea in a hurry.

The conclusion was inescapable. The only way to make Mark IV plans available was for us to do it ourselves. We could minimize the risk by making sure it is a good design (which we have already done), making sure the plans are complete and accurate, providing good builder support, and continuing to promote following the plans, using approved materials, good workmanship, and safe flying. We do not plan to prepare any information kits or do any advertising until the plans are completed.

## FIRST FLIGHTS

We try to encourage builders to write to us about their first flights, which are memorable experiences, but apparently new Cozys are flying so regularly they don't think it is worth the effort. Write to us, guys (and there will be a couple of gals too), we want to hear about it.

1. We know Al Yarmey is flying his N923 AC, because he came to Oshkosh with his family of 4. A beautiful airplane and a couple of beautiful children. His airplane featured a front canopy which slides forward, and gull wings doors in the back.
2. Tom Gross, in Florida is flying, but we do not have a written report or pictures.
3. Finnino Campos showed us pictures of a beautiful new Cozy flying in Brazil, but we neglected to get the name of the builder.
4. There is a new Cozy flying in New Mexico that we haven't been able to track down.

In addition to the above, Dan Davis in Wyoming, Jeff Russell in North Carolina, and Chris Esselstynd in Wisconsin have all reported that they will be flying any day now. We should have somewhere between 40 and 50 Cozys now flying.

## BEWARE!

John Ashe, in North Carolina almost had his Cozy stolen. John did not have a key lock on the canopy door, so someone was able to open the canopy. The nav lights had been painted out (?), and someone had attempted to jump start the ignition, without success. John doesn't know whether the thief had been scared away, or just gave up, but he considers himself lucky and has installed a lock on the door .

## ENGINE BREAK-IN

(Reprinted in part from EAA Technical Counselor News, by Jack Hakes). The smooth, honed cross hatched surfaces of

freshly refinished steel or chrome cylinders with their mating rings and pistons are not what you think. Looked at under a microscope, they are as rough as the Rocky Mountains. The desired break-in really consists of wearing off the peaks of these surfaces. Needless to say, this generates a vast amount of heat. Too much heat and pistons get scuffed, cylinders score, and rings lose their temper. The engine consumes oil and generally performs poorly. I know of more than one engine which had to be topped because of this situation.

Since we know that excessive heat is the problem, a simple procedure will virtually assure a good break-in. I've used this with excellent results on a variety of air cooled engines. What I do is prevent overheating by limiting the running times.

The initial run is preceded by removing one spark plug from each cylinder, then turn the engine over with the starter and watch for oil pressure to build up to approximately 20 PSI. Use straight mineral oil and in cold weather preheat the oil and the engine to 80 deg. F. Install the plugs, place the aircraft pointed into the wind, have an assistant stand by outside the aircraft to watch for oil leaks, keep people from walking into the propeller, and check the cylinder temperatures by feel. Start and run the engine under 1000 rpm until the cylinder barrel fins (not heads) get too hot to keep your hand on. Be sure to monitor the oil pressure and cylinder head temperature on each run. This usually takes between 20 and 30 seconds run time. Then shut down, and let the engine cool down to ambient temperature.

The subsequent runs usually are about double the preceding time before the fins get too hot and you must shut down, i.e., the second run will be 40 to 60 seconds and the third run will be close to two minutes. Record these times and temperature readings at the start, during, and at the end of the runs. Max CHT of 500 deg. F for most engines. Gradually increase the rpm and the run times until the total run time is 1/2 hr. Then try a brief, not over 15 seconds, run at full power. Make any ground adjustments during cool down periods and check on the next run. When your rpm has reached 1600 to 1800, make a quick mag check on one of the last run times prior to flight.

Now it's ready to fly. Keep the aircraft light (min. fuel, no baggage, no passenger, etc.) Push or tow the plane to the takeoff point since taxiing can easily overheat and ruin the engine!! Use minimum power to get some speed and cooling airflow before applying enough power to achieve a flat climb out to a minimum cruise altitude. Use minimum rpm to achieve level flight for good cooling.

After 5-10 minutes, fly for 30 minutes at maximum cruise power settings for your aircraft. Monitor engine instruments and record all temperatures. It is best to have CHT probes on each cylinder. In about 1/2 hour, the CHT should decrease approximately 50 to 75 deg., showing that initial break-in has been achieved. Keep the engine working at all times, and avoid abrupt fluctuations. After you have landed, check the oil and determine consumption. Repeat the flight as outlined above for another 30 minutes, and again measure oil consumption. If excessive, fly the airplane for 45 minutes at full rated allowable power. If high oil consumption continues, check compression for proper ring seating. It is possible to have to remove and deglaze the cylinders, and start over with the break-in procedure. However, if the above directions are followed this is very unlikely. For the next 10 hours, operate the aircraft with light loads and power settings. Avoid sudden power reductions which can cause cooling cracks. During descent, plan ahead and start descending further out and keep the rpm and cylinder head temp. up. Check the oil screens or filter at the end of the first hour or two for metal particles. It is normal for some small metal particles to show up in either the screens or filter. Check these particles with a magnet to see if any are steel. The oil filter should be opened up and the element spread out to thoroughly check the interior of the pleats for particles. This procedure should be repeated again after about 10 to 15 hrs of run time on the engine. If oil consumption has stopped, a detergent type aircraft oil can be put in after 10 to 15 hrs operating time.

Steel cylinders do not glaze as easily as chrome cylinders. Therefore, it is very important not to allow chrome cylinders to glaze over by running at low rpms. If glazing occurs, high oil consumption can be expected during the life of the engine unless the cylinders are removed and deglazed.

I recommend that a newly built aircraft should not use a new or freshly overhauled engine for ground taxi tests as this can be very detrimental to proper break-in procedures due to lack of cooling.

### CYLINDER HEAD TEMPERATURES

.Lycoming sets CHT limits for their engines as follows: Absolute max. is 500 deg. F. Max. for continuous operation is 35 deg. F and max. for longest engine life is 400 deg. F or less. These limits are for down draft cooling with temperatures measured with a bayonet probe at the bottom of the cylinder, which is the hottest spot with down draft cooling. So how should we measure temperatures with up draft cooling when the hottest part of the cylinder is on the top? With a bayonet probe at the bottom, which is no longer the hottest spot? Or with a sparkplug thermocouple at the top, and how would this reading compare with a probe? RAF ran tests on a fully instrumented Long EZ and published valuable data in CP47, p. 10. They determined that a sparkplug thermocouple reads approximately 40 deg. F higher than a bayonet probe adjacent to it. They also determined that there was a 40 deg F temperature gradient from the bottom to the top of the cylinder in climb with a rich mixture (fuel doing part of the cooling) and a 70 deg. F gradient in cruise with a lean mixture (air doing all of the cooling). What does this mean, as far as the temperature limits are concerned?

In a Cozy with up draft cooling, if you measure CHTs with bayonet probes at the bottom of the cylinder, you are not measuring the hottest part of the cylinder and you are looking at a false low reading. You should add 40 deg. F to your reading in a climb with rich mixture and 70 deg. F to your reading in lean cruise.

Conversely, if you measure CHTs with spark plug thermocouples on top of the cylinders, you are measuring the hottest part of the cylinder but the thermocouple will be reading 40 deg. F higher than a bayonet probe would, if it were possible to locate one there. In this event, you may subtract 40 deg. F from your readings.

Because of the above considerations, it would seem safer (and certainly cheaper) to use thermocouples under the top plugs, with the logic that a false high reading is better than a false low reading. Incidentally, Lycoming says that when they supply engines for factory aircraft with updraft cooling, they locate the thermocouple probes on the top.

It is typical in a Cozy (and other pushers) that the cylinders closer to the firewall (#3 & #4) run hotter. It is easy to understand why. High velocity air coming in the scoop does not want to change direction until it hits the baffle at the aft of the cowl and is deflected through the fins on #1 & #2. Also, these two cylinders are closest to the cowl outlet and the prop, where the pressure is the lowest. As a result, cylinders #3 & #4 are starved for cooling air. There is a simple remedy. You can install a turning vane in the bottom cowl to deflect the air into cylinders #3 & #4, and you can install reverse scoops in the top of your cowl to lower the pressure above cylinders #3 & #4. See the sketch below.

## GROUND PLANES AND ANTENNAS

The 3M Co. (my former employer) is probably the best known tape manufacturer in the world and is also noted for its innovative approach to new products. It is the manufacturer of the copper tape which we use for building antennas in composite construction, and which is identified as Scotch Brand Foil Shielding Tape #1194. In the past, we have used this same tape to make ground planes, but the problem has been that we had to connect the strips with a wire soldered to each strip. This was tedious and messy, with all those solder lumps. Now good old 3M has come up with a solution. It is called Scotch Brand Foil Shielding Tape #1183, which has a conductive adhesive. This tape is also tin plated so it will not oxidize. This is an exciting development because it will make ground planes (needed for Loran and ADF) so easy to build. Now all you have to do is layout parallel strips of 1194 on the foam, and then join them together with one strip of 1183, and stick the 1183 to the antenna mounting plate. The 1183 adhesive contains silver coated microspheres, and when you press down on the tape, these micro spheres establish electrical contact between the two layers. The acrylic adhesive also prevents oxidation of the surface it is in contact with, so you can stick it to bright aluminum and the conductivity will not diminish with time. Electrical resistance through the adhesive is 0.005 ohms/sq.in. , which we are told is ideal for ground planes. We have asked both of our suppliers to stock this tape.

## BUILDER HINTS

You can greatly speed up the time it takes to make a layup by mastering the technique of using a rubber squeegee. In many cases you don't even need to use a brush. We recommend cutting one of your 6 in. squeegees (from either of our suppliers) in half, resulting in two 3 in. squeegees. You should always clean them after use, but if you forget, you can remove cured epoxy with a belt sander, which will make them as good as new.

It takes a couple of minutes for epoxy to soak in and wet out one or two layers of glass cloth. Rather than waiting for this to happen in a small area, use this time to spread epoxy over as wide an area as possible. Pour a ribbon of epoxy on the cloth and follow behind with the squeegee spreading it. Keep the pressure very light, so as to not disturb the cloth. After the cloth is wet out, you can increase the pressure of the squeegee to distribute it. You can pick up excess epoxy with your squeegee, wiping it off on the edge of your mixing cup. Conversely, you can apply a small amount of epoxy by dipping your squeegee into the mixing cup. If you practice these techniques, you will find that you can make lay ups much more quickly.

Do not waste time trying to get just the right amount of epoxy on the lower layers of a multi-ply layup. Actually, cloth wets out better from underneath and not as much air is trapped between layers. It is only on the last layer that you need to spend the time working on getting the air out and applying the optimum amount of epoxy.

Do not leave bristles from the throw-away brushes behind in your layups--they weaken it. You can pick them up with the tip of a brush.

## SHOPPING

1. We have just ordered a new supply of Cozy decals. They are 4" x 14", self sticking, and look nice on the nose and winglets. They are available in black, dark brown, blue, red and green. We need to charge \$5 ea. to cover our cost. State color and send checks to Co-Z Development, 2046 N. 63rd Pl. , Mesa AZ 85205.
2. Cozy Owner's Manuals are still available for \$15 ea. Order as above.
3. Nosegear crank ratchet. Locks nose gear up, or down, to prevent unintentional operation. Direction reverses with thumb switch. Recommended. Retrofittable. \$34.95. Contact Curt Smith, 5114 Canaan Center Rd., Wooster OH 44691.
4. Small, light weight electric solenoid valve. Allows you to prime engine remotely from cockpit. Stocked by our suppliers. Skinner B2-DX62 12 VDC.
5. Brock nosewheel \$50, round Carr Tac with sender \$50. Contact Harold Cushing, Stage Rd, HC10, Box 67, Chesterfield, NH 03440.
6. Fuel sight gages. Very attractive. Easy to read fuel level. Retrofittable. \$30/set US and \$36/set OUS. Contact Vance Atkinson, 3604 Willomet, Bedford TX 76021.
7. Abrasion resistant clear polyurethane tape, 3M product #8671. Can be applied to leading edge of propeller to protect against rain. Contact our suppliers.

## ACCIDENTS

The purpose in investigating accidents is to try to determine the cause so that they might be prevented



from recurring. In NL #29 we reported that we received very sketchy information about a Cozy crash in Brazil during initial testing which was fatal to the two occupants. We couldn't get any more information until we talked to a friend and Cozy builder from Brazil at Oshkosh, who knew the builders, had seen the airplane, and took part in the investigation. He felt very bad about it (as we all do), and said it was the result of a terrible combination of human errors, and could have been prevented if the builders had listened. He gave a number of examples. A glass cloth had been used which was not sized for epoxy, and the cloth was not wet out in the center spar or ailerons. One or more hard points in the centerspar had been loosened by driving wing attach bolts with a hammer through holes which did not line up. This allowed the wing incidence to change in flight. No epoxy had been used to attach the aileron torque tube to the ailerons, and too few rivets, which allowed the torque tube to separate from the aileron when torque was applied. His analysis was that the hardpoints in the centerspar were loose, the wing incidence changed in flight and the airplane started to roll. When aileron input was applied, the torque tube separated. He said that because wrong materials had been used, the plans weren't followed, and the workmanship was so poor, the airplane was judged to be unairworthy, but the builders "never listened".

## LETTERS

Dear Nat, July 6,1990

As usual, I forgot to renew. Our two week trip went well, we made 9 stops and put 22 hrs on N43CZ. The airframe and engine had no problems except for a minor oil leak which I still can't find.

You probably heard that Shirl Dicky had an engine fire (Buick V-8) during the Jackpot race. He managed to deadstick it in with the engine stopped from 1/2 mile out. He did a fine job of getting it on the runway. Shortly after touchdown the right main gear collapsed due to heat and the E-Racer swerved 90 deg. to the right, ending up about 5 ft. off the runway in a small ditch with both mains folded back. Jeanna Yeager was with Shirl and both escaped with no injuries. The airframe looked to be in good shape. The engine compartment was very hot and blackened. Shirl thinks the new exhaust system ignited the engine cowl.

One other incident at Jackpot. A long EZ had converted his single pipe exhaust to a 4-pipe exhaust by inserting a flat piece of metal down the center. The piece came out in flight and took 4 inches of his prop tip with it, and split the prop down the center to the hub. All this happened during our heat and he managed to limp back to the airport with a broken Great American stub--Lucky!

We ran our usual 208 mph (still haven't done any engine mods). Mike Marshall showed up with his MT prop. He turned 195 mph. We wound up 6th place out of 11. Top speed in our class was 223 mph. Except for Shirl's incident, everyone had a good time.

A1 Yarmey flew his Cozy last Sunday. The first flight was 40 minutes. Basically no problems. They are planning to go to Oshkosh with the 4 of them. Yes, they had a baby boy 6 lbs. 1 oz.

We want to thank you for your hospitality, and look forward to seeing you at Oshkosh

Vance Atkinson

Dear Nat, Aug. 28, 1990

I have not been idle since my last communiqué. I had expected that I would get the fledgling on its legs over the summer, but I suspended work on the plane long enough to drywall my garage and get organized into something resembling a workshop. This side trip will make it easier to work through the winter, but it has put me off my schedule a bit.

I glassed the fuselage 2 weeks ago, and am just now getting to the rollover structure. I hope to have it in place by the end of the upcoming Labor Day weekend. After that, the semester kicks in again, and the Cozy drops down a notch in Maslow's hierarchy until next summer.

A month ago I had the good fortune to meet Vance Atkinson. I got an anonymous phone tip from someone in our EAA chapter that there was a Cozy builder over at Dave Ronneberg's shop. The EZ gang at SMO are a wonderful group of folks, but there are some differences in our two planes. Notice the interesting sidestrip in the enclosed photos of my fuselage? They represent about a 10 hr detour from the plans. I was advised to lay in conduits for the wiring before glassing the exterior. Needless to say, it didn't work out. So when I heard about Vance, an honest-to-goodness Cozy person, I zoomed over, took him hostage, transported him 3 miles to my garage and forced him to evaluate my project.

Vance not only gave me some good pointers and specific advice on my project, but he also had a number of great ideas for organizing my workspace. Still better, he was very encouraging about my work and urged me to keep my momentum up. Just the shot I needed.

All in all, I'm very grateful that there is such a wonderful support network for composite builders in place and available to me. I could not hope to pull this off without the patient, willing assistance of those who've gone before.

(Miss) Liese Aufill

Dear Nat, Sept. 12, 1990

Just realized that I had not renewed my newsletter. I am just about to finish the center spar. Boy, will I be glad when it is complete "Ha". Then I will install the main gear and build up the nose section and install the nose gear .

I enjoyed the forum at Oshkosh and seeing all the cozys.

Leroy Fishel

Dear Nat & Shirley, July 5, 1990

Please find enclosed \$10 for 2 Cozy decals for the side of our plane. Would prefer dark blue. Looking forward to seeing both of you at Oshkosh. We currently have over 270 hours on our Cozy 177. Enclosed is my business card. Looks good, doesn't it!

Walt Suminski

Dear Nat and Shirley, Sept.21,1990

I am trying to finish up on my Cozy N238CZ by Oct. 31, 1990. The paint shop could extend this date a little. I would like you to notify other builders who have not purchased an engine for their Cozy. If the engine that they plan on using is a 0-320 Lycoming, I would not use the 0-320-H2AD or 0-320-H2TD. I had about four major problems with the 0-320 I used. I will first give you the problem, and then my fix.

1. The engine mount did not have clearance on the top tube support. This was true with both Brock and Weldtech. I used Weldtech's mount because of other problems with my engine. Weldtech reworked my engine mount to fit the engine for free. Weldtech advertised that their mount would fit all 0-320 engines. I called Brock about my problem. They said that they could make the mount but would have to charge an extra \$100 to \$150 for the change.
2. The magneto P-leads had no clearance. Weldtech's mount was chosen because of firewall clearance. It was 0.75 in. farther away from the firewall than Brock's 0-320 mount. Even with the Weldtech mount, I had to cut two 2 in. dia. holes into the firewall through the aft face of the centersection spar. The two holes were glassed inside the spar with two plies of BID, a piece of 0.25 in. thick plywood, then 5 more plies of BID. The firewall was repaired by inserting fiberfrax, then a 0.062 in. thick aluminum cup.
3. Clearance problems at the top of the engine, behind the starter ring gear. The fuel pump must be mounted there. I installed blisters on the top rear of the cowlings.
4. Clearance problems with the spin-on oil filter and rudder cables. I changed the spin-on to a screen, and changed the bell cranks and pulleys to straight through cables with just pulleys. Other than these engine problems, that were from my engine change, you could not ask for better plans. I am sure glad that before I started the electrical and engine baffling, I filled and primed the bottom of the wings, canard, fuselage, canopy and strakes. I think 50% of building a Cozy is just body work. If you end up with all your body work to do at the end, it could be very discouraging.

Thanks again for all your help!

Jeff Russell

Dear Nat, Aug. 27, 1990

I recently purchased the plans and all newsletters from Dan Heald, a co-worker and good friend. I am a newcomer to the homebuilt movement, and after careful consideration, decided on the Cozy. I investigated many other aircraft, but could not find one that satisfied my needs -performance, good looks, proven design methods, and reasonable cost. I have always admired the Long EZ and

considered it as an option, but I wasn't too happy with the cockpit. Dan Heald introduced me to the Cozy, and I was hooked (of course my wife had a place in the decision).

I have been a pilot since 1978, and am the owner of a PA28-180 for three years. I enjoy aircraft ownership but would like to have something a bit different, a Cozy. The challenge of building an airplane really excites me and I am chomping at the bit to get started.

The people within the flying community - especially the homebuilders and supporters - are fantastic. They offer that "hidden advantage", which more than justifies the commitment and sacrifices involved in such a project. I look forward to working with you and with those I have yet to meet. Thanks for providing such a wonderful design.

Derrick Aubuchon

Dear Nat, Aug. 15, 1990

I wanted you to know how Cozy #570 is developing. As you know, I am converting a completed and previously flying Long EZ to a Cozy. I chronicled the building of my Long EZ at Enewetak Atoll and its subsequent flight to Papua New Guinea in April and May 1987 *SPORT AVIATION*. Since then I have used it extensively in Papua New Guinea and Australia. We left Papua in November 1987 and being unable to sell the plane for a reasonable price either there or in Australia, I opted to ship a major portion of the airframe, engine, instruments, etc. back to the states. In thinking about how to disassemble the Long for the most compact package, the size of the fuselage was the major problem. After thinking some more (while still trying to sell the plane) about what I really wanted, I decided I would really like a Cozy instead of a Long for all the oft-stated reasons. I therefore decided to revamp my aircraft into a Cozy. After returning to the US, using as many of the original parts as possible. I bought from you what was perhaps the last set of Cozy plans sold in the US and one fine day went down to the airport with a wide assortment of saws, chisels and other tools of destruction. I proceeded to saw off the fuselage, in one piece, the entire center section and fuel tank strakes of the Long, and then reduced the rest of the fuselage to unusable bits while removing the NG30s, front gear, all metal parts, etc. I have to admit the first cut was a bit distressing, taking a perfectly functional aircraft and making it very unfunctional!

I intend to fully document the whole process of building a Cozy from a Long in *SPORT AVIATION*, but just want Cozy builders to know it can be done. There are probably lots of Long EZ drivers out there who wish they had a Cozy. At present, my Cozy is nearing completion and I hope to fly it within a few months. There is a horrid thing called work that occasionally gets in the way of building airplanes.

To make a Cozy out of a Long EZ, you basically have to do the following: build a new fuselage, build a new canard (but not elevators), do some modifications to the centerspar so it lines up with the longerons on the Cozy fuselage and then carefully mate up your centerspar/strakes with the new fuselage. You will need a new engine mount, new cowls, all new landing brake and trim metal parts, new canopy and other odds and ends. You can use your old wings, centerspar, strakes, elevators, landing gear and stuff from the instrument panel. If you salvage as much as possible from your old

fuselage and sell what you can't use to someone building a Long, I think the job could be accomplished for about \$3,000 and take a year or so to do. Mine is taking longer and costing more because I am upgrading a lot of things and don't have a lot of time to work on it. If someone was able to plan things well, he could build virtually all of the new airframe pieces (fuselage, canard) without taking his old bird out of service. I bet the entire modification could be done with the aircraft out of service for 6 months or less if you could plan to do it that way.

Is anyone out there converting a Long EZ to a Cozy? If so, I would be interested in hearing about it. I will let folks know how things have gone once we are close to actually getting off the ground again. Anyone out there interested in purchasing in good condition the following Brock parts for a Long EZ: Engine mount (dynafocal 0-235), rudder pedals, some landing brake and trim parts, 4" SAE-1 prop extension.

Sincerely, Patrick L. Colin