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COZY NEWSLETTER #42

July, 1993

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We are pleased with the new, 4-pipe exhaust system being built by **Custom Aircraft Supply**. This system will fit any pusher, has slip joints at the flanges to prevent cracking, a super heat muff, and we recommend it without reservation! At Chino we talked to a Long EZ pilot who has a 4-pipe exhaust system without slip joints, and he said his pipes have cracked 4 times, and he is going to have to replace them with the system we recommend.

PERFORMANCE PROPS

We first listed Performance Props as a recommended supplier of propellers based upon the good reports we heard from others, including Cozy builders Todd Morgan and Chris Esselstyn. Their 3-bladed props were reported to run very smoothly and quietly, and give very good performance numbers. These were qualities we were looking for also, and even though we already have a Warnke and B & T prop, we decided we should try a 3 - bladed Performance Prop.

We contacted Clark Lydick, who seemed to be very knowledgeable. He was able to translate the

feedback from 3-place Cozys to what we should have for the Mark IV. We sent a deposit and a short time later, the 3-bladed prop arrived. By agreement, it was not permanently finished. We were to test it, and then send it back for final finishing and/or rework if necessary.

We tested it, didn't want anything changed, sent it back for finishing and installation of a urethane leading edge. It came back, looked beautiful, and we reinstalled it with a new spinner. Here are the numbers: Static RPM at field elevation of 1,380' (3,500' dens. alt.) and about 75F was 2390-2400. Initial ROC was 2,000 fpm. Full throttle at 8,500' dens. alt. (75% of rated power) was 2680-2700 rpm and TAS was 218 mph. We are very impressed that he hit the numbers we wanted right on the head, and that there was only 300 rpm difference between static and full throttle cruise. Yes, it does run very smoothly and quieter than a 2-blade. We attribute the smoothness to only one blade at a time passing through disturbed air. The quietness probably due to the smaller diameter, and the performance to the blade design. If you can afford the higher price, you should be pleased with the Performance 3-bladed prop.

Incidentally, we learned that after the first 1/2 hr. flight, bolt torque dropped from the initial 42 ft-lbs to only 25 ft-lbs (see write-up on torquing prop bolts).

PROPELLOR INSTALLATION

We have heard reports, from time to time, of propellers coming off in flight; fortunately, none on Cozys, as far as we know. The latest was a Long EZ in Dallas. Vance Atkinson gave us this first hand report: "Two months before Sun & Fun, one of the local Long EZs took off for a test flight with a new 3-bladed prop. It almost ended in disaster! He was lucky enough to keep his wits and his EZ. Ken Frances had bought the new 3-blade Catto prop but was unable to run it due to short prop bolts. One of the local Long EZs thought they would try it while Ken waited for his bolts. The prop was bolted on the Long EZ and after taking all the data down on the 3000' run, he proceeded to zoom up to 8000' to record the good stuff there. It was then the prop decided to leave the engine. Now I don't have to tell you how quiet and hot it got! The pilot was able to dead stick the EZ glider in a local field. Didn't even run off the end of the runway, and didn't to melt down the gear legs from heavy braking! I helped him take the wings and canard off the next day so he could truck it home.

The damage was phenomenal. The 4130 steel mount was bent, the extrusions damaged, the engine was sagging onto the lower cowl, the prop extension lugs were all elongated, and upon closer inspection over the next several days, the following was observed. Both the Nav-Com and the Transponder were damaged internally, the fuel pressure gage was kaput, the engine crankshaft had to be replaced along with the rods, cam, 2 valves, all the steel gears and one mag. The airframe showed no signs of damage, how about that? Tougher than steel! Needless to say, this was an expensive test flight even though the aircraft and pilot survived!

"So what happened to cause this mess? The prop was recovered 2 weeks later and amazingly enough there wasn't a scratch or nick on it. All three blades were there and the crush plate was still attached! There were 6 elongated bolt holes about one half inch deep on one face of the hub. These digs were caused by the lugs on the flange when the prop left. The conclusion seems to be that insufficient torque was the culprit! This prop was sent by the manufacturer with no verbal or written instructions on torquing. Since it was a 5 laminate core, it was assumed to require 20 ft-lbs. Upon calling the manufacturer, he immediately stated oh no! You guys need at least 35 ft-lbs. GREAT! Now he tells us!

The prop is being looked at to see if it is repairable, but the expense still remains on the EZ. After flying my Great American prop for 6 years, I've more or less taken it for granted. I switched to 7/16" bolts years ago and not had a bit of trouble or loosening over the years. An episode like this can ruin your whole day and remind us who is the BOSS!"

When we visited Vance in Dallas, we saw the prop and extension. The bolts were AN7 bolts. Three had failed in shear, and the other 3 had pulled out of the lugs as the prop departed. This accident caused quite a bit of discussion about the best way to install a propellor, and caused us to research the subject. We can pass on our conclusions for your benefit.

Wood propellers have many advantages over metal props. If properly installed and maintained, they should provide a long life of trouble-free service. If not properly installed and maintained, one runs the risk of losing the entire propellor in the air, with possible catastrophic damage to the engine, and possible damage to the aircraft and injury to occupants in the ensuing forced landing.

The principles involved in a proper installation are quite simple. Engine torque is transmitted to the propellor by static friction between the propellor flange and the propellor hub, **NOT** by the lugs in the flange or the bolts. The static friction is obtained by compressing the hub between the crush plate (on the aft face of the propellor in a pusher) and the propellor flange. The only function of the bolts is to provide this compression by torquing (tensioning) them to the proper value. The only difference between a metal prop and a wooden one is that the wooden one can swell or shrink, with changes in the environment, so it is necessary to check bolt torque after the first flight on a new wooden prop, and frequently thereafter, until the torque values stabilize, and occasionally thereafter. The bolts will fail in shear, regardless of the bolt used, if not properly torqued, or can fail in time from fatigue, if either the metallurgy or the threads are not designed for this critical application. A few other important requirements should be mentioned before discussing propellor bolts in greater detail.

1. **Propellor hub Extension**, The propellor hub extension should be made from the strongest suitable aluminum alloy, which is 2024 T3. It should be properly radiused in the corners to avoid stress concentrations. Most reputable suppliers meet these requirements. 6061 T6 is a cheaper alloy, but it is not acceptable. When you purchase an extension, you will be asked to specify the diameter of the propellor flange and the size of the bolts to be used. For 160 - 180 hp, we recommend the largest diameter flange available, i.e. 7 inches, to provide the greatest contact area between the prop and the flange, and the largest diameter bolts, i.e. 1/2 inch, to provide the greatest margin of safety in torquing the bolts.
2. **Crush Plates**. The function of the crush plate is to distribute the compression force of the bolts uniformly over the greatest area of the hub. It should be the same diameter as the flange, i.e. 7 inches, and it should be 1/2 inches thick, so it will not deform.
3. **Bolt Torque**. The bolt torque should be the maximum amount allowable without crushing the wood or overstressing the bolts. The proper value should be obtained from the propellor manufacturer because it is a function of the type of wood used and the number of laminations, as well as the flange, crush plate and bolt diameters. Recommendations could range from 35 to 50 ft-lbs for 1/2 in. bolts. We prefer the higher value for best margin of safety. The bolts should always be tested for length, to make sure they completely engage the lugs, without bottoming out, with sufficient threads remaining to allow for periodic retorquing. The threads should always be lubricated before each installation, and the bolts should be a good fit through the crush plate

and prop hub, to avoid resistance to torquing. They should always be safetied with .041" safety wire, two bolt heads together, preventing each from loosening.

4. **Propellor Bolts.** Propellor bolts are one of, if not the, most critical applications in an airplane. Less than the best bolts may be okay for awhile if they are strong enough and properly torqued. On the other hand, even the best bolts will fail if not properly torqued. There are potential problems with either AN bolts or industrial bolts, but fortunately there are special bolts made specifically for propellor installation.
5. **AN bolts** are made in accordance with military specifications for critical aircraft use, using approved alloys, specified heat treatment to achieve the right combination of tensile strength and ductility, and have rolled (not cut) threads to avoid stress risers which could lead to fatigue failure at the threads. Unfortunately AN bolts are difficult to obtain in the lengths required for propellor installation (particularly AN8), and the thread length does not allow much room for error. For example, the lugs for 1/2" bolts have a thread length of .54" and, in spite of the "book" value, we have measured the thread length of AN8 bolts to be as short as .62" If AN bolts are fully engaged in the lugs at initial installation, there would be very little margin for retorquing, without bottoming out the If the threads bottom out, the bolts will soon fail in shear.
6. **Industrial bolts** are readily available in hardware stores. They come in various grades, the most common being grade 5 and grade 8. They have approximately 1-1/2" of thread length, but unfortunately, the threads are cut rather than rolled, which is against standard aircraft practice and more likely to lead to fatigue failure. Grade 8 bolts have a tensile strength of 150,000 psi (compared to 125,000 psi for AN bolts), but because of their high strength, are too brittle. Grade 5 bolts have a tensile strength of 120,000 psi, and are closest to AN bolts in properties, but have cut threads. The most unfortunate thing about industrial bolts is the lack of enforcement on quality. Our local ACE hardware store said their bolts could come from any of 6 different countries, based on price. Are you willing to risk whether they might be made from inferior alloys and not have the properties they are represented to have? Traceability of bolts to a reputable source is the best protection against their being counterfeit.
7. **Sensenich Propellor bolts.** Our research led to the discovery that Sensenich, manufacturer of props for the last 61 years, has been having one or more reputable US manufacturers of AN bolts, make special propellor bolts to their specifications since 1956. These bolts are traceable, made to mil specs similar to AN bolts, have rolled threads (per aircraft practice), and have a longer thread length. These bolts are made from approved AN alloys, are heat treated to RWC-26-32 to obtain a minimum tensile strength of 125,000 psi without sacrificing ductility, are centerless ground to remove surface imperfections, have J-2 threads rolled on to a length of about 1.4", are then plated and the heads are drilled for safety wiring. These bolts are stocked by Sensenich in AN6, AN7, and AN8 sizes of various lengths, and sold in lots of 6 with washers. They are slightly more expensive than AN bolts of an equivalent size. We purchased 6 AN8H-57AS bolts from Sensenich for \$90. We strongly recommend buying propellor bolts from Sensenich. Contact either Ken DeGraph, or Ed Zircer at (800)-462-3412. For reasons explained above, we do not recommend either AN or industrial bolts.

WHAT WE HAVE BEEN DOING

We were asked by Dianne Davidson, of Alexander Aeroplane, to let them have our Mark IV for 10 days or so to finalize the design and install an interior kit, including seat cushions, carpeting, arm rests, head liner, etc. Accordingly, I flew the Mark IV to Griffin GA about 2 weeks before Sun & Fun. The weather leaving Arizona was great, but deteriorated rapidly in Texas, as it always seems to do. I stopped overnight with the Atkinsons in Dallas, and got to see the Cozy Classic that Ken Francis was finishing up for Dick Smith. It looked nice, but unfortunately was way overweight.

The next morning in Dallas it was awfully cold and there was a low overcast with poor visibility. At noon I decided to give it a try, climbed up through a hole, and flew VFR on top to Griffin. I was met there by the Alexander people and the Gores (Cozy builders), we hangared the Mark IV, and then I was the overnight guest of the Gores. The next morning I toured Alexander Aeroplane, meeting all of their fine staff, and then Ron Alexander dropped me off at the Atlanta Airport to catch a flight home.

About 10 days later, Shirley and I caught a flight to Atlanta to pick up the Mark IV. We were met by the Gores, had a lovely dinner, and stayed with them overnight. We were very pleased with the new interior kit Dianne had installed. We had planned to continue on to St. Augustine the following day for a photo flight with U.S. Aviator magazine, but the bad weather from Texas had caught up with us, and the photo flight was called off. We stayed in Griffin, giving rides around the patch under a low overcast to Joe Gore and Gene Knapp (Cozy builder), who had come down from Birmingham to see us.

The following morning we decided to wait for the Alexander people to load up their DC3, so we could fly wing on them part way to Lakeland. Don and Julie Downie were on board, and took pictures of us parked off the right wing tip of the DC3 as we climbed out through the clouds. It was difficult for us to climb slow enough to stay with the DC3, so after the picture taking was finished, we did a few gunnery runs and then left them in our dust. We headed for Winter Haven to meet Jim "Zoom" Campbell, toured the headquarters of U.S. Aviator, in an attractive building right on the airport, and then took Jim for a test flight. He was more thorough than any of the other writers I have taken up in Cozys since 1982, and he said he was very impressed with the Mark IV, and it was much nicer than he had imagined (See his flight test report in the July '93 issue).

We didn't have reservations in Lakeland till Saturday night, so we buzzed up to Orlando to visit Cozy builder [Mike Pinnock](#) and wife Jerry. Mike has a software company, and wife Jerry has a law office in their home. They took us to a delightful and popular Italian restaurant that had excellent food, and they had jugs of wine at each table for diners to help themselves.

The next morning we gave demo rides to Jerry (Mike wanted his wife to have a ride. Spousal support is most important!) and Cozy builder [Bill Walsh](#). During the demo rides, our KX155 cut out, so we borrowed a hand-held to fly down to Lakeland. Traffic into Lakeland on Saturday seemed like a zoo, but we survived. They parked us in row 44, which was about as far away from the action as possible, but quite a few people found us. Altogether there were 13 Cozys at Sun & Fun.

We had rented a condo with the [Wilhelmsons](#) and Clyde Rutledge, which was a lot more comfortable than either camping out or a motel. Sunday night we attended the Cozy banquet arranged by [Bill Walsh](#) at the Red Barn steak house. It was a huge success. 59 builders and spouses attended. The food was excellent; we had a 32 oz porterhouse steak for two.

We got our KX155 fixed by the local avionics shop and stayed the week. Weather was superb. We

attended a bratwurst buffet hosted by U.S. Aviator & Aircraft Spruce. Entertainment was a Dixieland band that was out of this world. Most of the members were regular employees of U.S. Aviator. We hope there is a repeat next year.

The anshows each day were Oshkosh quality. Especially beautiful and impressive was a night time airshow with pyrotechnics (fireworks).

We left on Friday morning. Our first stop was Crystal River, FL, to meet retired NASA test pilot Jim Patton and take him for a ride. He is planning to do some flight tests for us later in the year and publish a flight test report.

Our next stop was planned for Baton Rouge LA, to refuel. Enroute FSS advised us that wind shear was being reported at Baton Rouge. We dismissed this as a single occurance, but when we arrived some time later it was extremely gusty with winds from opposite directions on the runway. The gusts were so violent we aborted our first approach. The tower suggested that we touch down at mid-runway. On the second approach, we carried extra speed, touched down mid-runway, and I plunked the nosewheel down immediately. A tremendous shimmy started. We thought we had a flat nosewheel tire. The shaking was terrible. As soon as we slowed a little, it stopped. I was amazed that there was no damage. I tightened the friction damper and resolved never to put the nosewheel down at such a high speed again.

The weather was still bad in TX (doesn't the sun ever shine?). We stopped overnight at Austin, thinking it would be clear in the morning - it wasn't. Finally around noon it went from low overcast to broken and scattered, so we took off and flew home, where it is always clear and sunny.

We were only home one day, when we received word that Shirley's mother passed away, so we took off for the Twin Cities. We took advantage of our trip up there to spend a little time with our kids.

A week after returning to Mesa, I had to go to the hospital for emergency surgery. The recovery period was six weeks, so I am almost there. I have been taking it a little easy, but have managed a few flights to test propellers, send them back and forth, and make and paint a spinner for my new 3-bladed prop.

We are sorry to have missed Kansas City, but we were able to make it to Chino for a composite symposium this last weekend. it has been quite a while since we experienced the smog in the L.A. basin (is it always IFR there?) and again, we are glad we live in Arizona.

MORE NEWS FROM VANCE

One of the EZ guys in Ohio called to ask how my Multi-Spec paint was working out. To which I replied, not worth a darn. I like the color selection, it goes on just like Zolatone, but just doesn't hold up! To which he replied "did you use the clear coat?" And quick with a witty response I replied, 'WHAT CLEAR COAT?' It seems like Multi-Spec is naked without its protection. The clear coat is a water soluble polyurethane material that comes in gloss or semi-gloss. Get the latter. When it dries you can hardly tell its on there. You can put it on with a brush or spray it on. In either case several thin coats are recommended. I did my whole cockpit in two hours. The stuff dries in 15 min at 75F and boy is it tough! I put 2 coats on everything and 2 more where our feet slide in and out. This will also work over Zolatone and probably anything else. Its \$37 a gallon and that amount will probably do 10 airplanes.

Several people have asked about our ElectroAir electronic ignition. It sure doesn't seem like it but the first unit has been in for TWO years and the second one for ONE year! Both have worked flawlessly, with no radio noise. The after market fuel injection (Airflow Performance) unit has been in a year and a half and has done equally as well. The cold air induction system has been tested and removed to make a cast aluminum urn to replace the fiberglass plenum. This unit should be available at Oshkosh. It will include a new oil pan with no tubes running through it and Airflow Performance will market it. I don't know what it will cost.

Our new hangar partner Frank Bibbie has about 45 hours on his beautiful new VariEZ. Unfortunately he has had to repair both the forward portions of his main gear attach points. His EZ has the Long EZ gear mod and it was discovered (wrinkle on the fuselage side and gear making funny groaning noises) that the 15 BID pad was delaminating! A call to Melvill confirmed this and a fix was devised. Two weeks later the other side did the same thing. More calls to Mike. This time the fix was to go through the outer skin and rebond. Why this problem with all the 100s of heavy EZs and COZYs flying? RAF's not sure but thinks its because of landing with the brakes partially on, which puts a tremendous down load on the forward portion of the attach points. Since RAF reduced the amount of rudder travel on the VariEZs, it is very ez to apply a little rudder and be into the brakes and not know it. Thus the problem.

Arnie Ash will make a complete report on the Bahamas trip in the Central States newsletter. What he doesn't know is that June and [Dewey Davis](#), with their gorgeous brand new COZY had a real time of it. They started off from Washington DC and enroute to Sun & Fun landed at Sanford NC with a shredded nose tire. Apparently it went flat right after takeoff out of Washington (I hate it when it does that!) Upon touchdown, a few choice words of 'What the H' is going on. They knew they were going to have to come up with a tire and tube. They located a local Long EZ owned by Lt. Col. Charles F. Howard. For some strange reason, he didn't want to loan the Davises his tire, even though he wasn't attending any of the coming flying functions! Come on guys! Where is that famous southern Hospitality? It took 4 hours to find another and they finally got to Lakeland, right before dark! After a great time at the fly-in they departed Lakeland Tuesday morning for St. Lucy FL, our staging area for our hop off to the Bahamas. Unknown to Dewey and June, they had a stuck exhaust valve. This great discovery was made after landing and seeing oil dripping off the cowl caused by a bent pushrod and tube. They had a mechanic change the rod and tube and came on over to Great Harbor with their wingman and a Long EZ driver Don Hanson. They arrived 4 hours late in a good looking formation. After two glorious days of sunshine they were ready to go back with the main group. Unfortunately (you guessed it) the famous stuck valve struck again. Fortunately we had the famous Scott Carter with us who was able to save the day by saying a few choice words and bending the offending pushrod back to reasonable straightness. The pushrod tube was only slightly bent and therefore didn't need to be worked over. Among Scott's, Ken's, and my tool bag plus one of the natives vice and hammer, we were able to get Dewey going. By this time everyone had left and Dewey thought he would fly around awhile before departing over that large, lonely expanse of ocean. We watched him circle then off he went. A couple of hours later he called to say they had made it okay and he was having the valve guide reamed at an engine shop. This would get him home where he would get the rest of the exhaust guides reamed. Dewey has about 600 hours on his engine and after talking with a mechanic friend of mine, recommends doing the Lycoming AD that checks valve stem clearance starting at 400 hours. Might save you a swim!

Lynn and I went on an aerial tour of Great Harbor and saw some of the following: Beautiful, beautiful deep blue water with frothing white foam spraying 30 ft. high over shore boulders on the windward side of the island. A large pure white Scandinavian Cruise ship anchored off the North end of the island with

hundreds of sun worshipers on the top deck, some nude. A wrecked DC 3 in 20 ft. of water in one of the harbor bays. Two wrecked ships, one of which was a large freighter. Some very fancy houses and miles and miles of clear water two feet deep. We managed to see a half a dozen working vessels, and an occasional person on the deserted beaches. After we landed every place we went the natives sad 'You been up flyin' Mon!' Yessire, a pretty small place, ya shoulda been there! See ya next time, Vance and Lynn.

Deja Vu TODD MORGAN (Camarillo'93 Fly-in)

..... I always like to arrive the day before and airshow starts, it is nice to beat the crowd and watch the arrivals from the ramp. As the 1992 BEST COOMPOSITE AIRPLANE award winners, we were directed to a special champion row for parking. This is the place where you notice how popular this airplane really is. Being greeted by buddies as well as strangers that call me by my first name can be flattering as well as a little embarrassing. Then it hit me, that many of them had seen us in the February issue of Sport Aviation.....

..... Saturday's events included answering questions about - well you guessed it, THE COZY. I did get a chance to get out on my bike and ride it all over the airport. It was good exercise. People would ask, "How did you get that bike into your plane?" I would tell them that we don't bring snacks anymore.....

..... When the airshow portion was over and the airport was open, I took fellow Cozy builders Mike and Waldeen Doring for a check ride flight over the coastline towards Santa Barbara. We met them at the Merced and Porterville fly-ins last year. It was nice to charge their batteries by having them experience their first 'Cozy Difference'. After practicing slow flight and touch and goes, we did a low approach above the runway to get a real feel for how fast N2TM really is. We landed just before the sunset and were greeted by even more friends and strangers than before. I could see a big four foot wide smile on Mike's face when he got out of the Cozy; only Cozy fliers know why. We rode with Mike over to the nearby awards dinner dance. After dinner, the moment of truth was about to unfold for many aircraft owners and builders. Kathy's raffle ticket number was called. She won a year's subscription to Sport Aviation. My number was called and I won a case of Aeroshell oil. The Best Antique, Best RV, and President's Trophy were awarded. Then the President of Camarillo's EAA Chapter called for the owner of N2TM to come up and receive the BEST OF SHOW award. Kathy and I ran to the front of the auditorium. Before handing the award to us, Larry explained that all who attended the airshow cast ballots during the day and voted ours THE PEOPLES CHOICE favorite airplane. It was a thrilling experience to bring home two incredibly beautiful trophies two years in a row. The sounds of the Big Band kept us laughing and dancing into the late hours of the night. This capped off a splendid Saturday night.

The next morning I found plenty of room to store our new found treasures in the Cozy (along with the bicycle) for the flight home. The flight back to Brown Field took us through the LA TCA, down the coast and into the San Diego TCA. After landing, we visited the control tower in order to show off the new trophy. The controllers seemed as excited as we were with our good news. Camarillo will always be one of my very favorite airshows to attend in the years to come. This wraps up another flying adventure.

Thanks for listening.

Todd Morgan

CRANKCASE VENTING

Mike Melvill once said that the Lycoming was the most reliable aircraft engine he knew of, because if you kept it supplied with oil and fuel, it would keep on running and never let you down. In order to keep a Lycoming (or any other engine) supplied with oil, the crankcase must be vented. If not, pressure will build up in the crankcase and force the oil out somewhere. A couple of years ago Uli Wolter lost all of the oil in his engine, the engine froze, and he was forced down, fortunately over land just before crossing the North Sea. He attributed the cause to be an improperly installed main bearing/prop seal, which allowed all of the oil to be blown out around the crankshaft. He said he wished he had installed a crankshaft seal retainer, which would have prevented this.

Last year, after returning from Oshkosh, we decided to install a crankshaft seal retainer on the Mark IV plans model, to give us peace of mind that we would not have a similar experience, because we fly over mountains a lot, and replacing an engine (maybe also an airplane) is expensive.

After removing the cowling, prop, hub extension, and ring gear, lo and behold the crankshaft seal was lying loose around the crankshaft, but we had not lost any oil, except for perhaps a teaspoonful. How could this be explained? I attributed it to the fact that I run my 5/8" breather line straight down from the breather fitting on the crankcase, through the cowling lip, with the breather line cut at 45 deg. facing aft after it exits the cowling. This ensures that no oil or moisture can collect in the breather line to form a trap, and that the pressure in the crankcase will always be negative with respect to outside air pressure, and any leaks will be air coming into the crankcase, not oil going out. I stopped using an oil separator to collect the oil mist and return it to the engine, out of my concern that it was something which might plug up and shut off the vent. True, I might lose a little oil which could have been collected and returned to the engine, and true, I end up with a small oil streak on the bottom of my cowling after a long flight, but it is easily taken care of with a paper napkin. I figure this is a small price to pay for the added security and peace of mind knowing that I have a simple, foolproof breather.

Running the breather line straight out the back is another satisfactory option, as long as there is no trap in the line for oil or moisture to collect. Vance Atkinson exits his breather line along one of his exhaust pipes, so the oil mist impinges on the hot pipe. It is a not much more complicated, and eliminates any oil streak on the cowling or prop.

In a recent Canard Pusher, Mike Melvill recalled how he lost all of his oil and almost ruined his engine. He noticed his oil pressure dropping and made an emergency landing with only 1-1/2 qts. of oil remaining. He had lost 6 qts. in 1 hour. Before he could determine the cause and correct it, the same thing happened a second time.

Mike has a rather sophisticated breather system. The breather line runs into one of the exhaust pipes through an anti back-fire valve. A branch from this line runs into the carburetor venturi through an automobile PCV valve. Crankcase gases go into the carburetor at low power settings and are burned by the engine, or into the exhaust pipe at high power settings and are burned by the hot exhaust. Mike says

that this system worked flawlessly for more than 1500 hours. He believes that on this particular trip in below freezing temperatures, some moisture froze in the anti back-fire valve, which was already partially blocked with carbon, while his Long EZ was parked overnight, and in spite of warming the engine before takeoff, continued to block the anti back-fire valve, forcing all of the engine oil through the carburetor. He believes that if he makes a thorough inspection every 100 hours, plus pre-heating the engine compartment in sub zero temperatures, it will prevent any future occurrence.

Mike is a very diligent and conscientious builder-pilot, and we are sure he won't have any further problems. However, our philosophy is and always has been to use and recommend the simplest system which works. Be aware of the importance of properly venting your engine, and be sure your breather system is as fool proof as you can make it.

CAUTION - ICING CONDITIONS

Chris Esselstyn was flying his Cozy solo, near the aft c.g. limit on a business trip in bad weather. He wanted to climb through a 3,000 ft. cloud layer with icing conditions. He asked for and received permission for an accelerated rate of climb. He entered the cloud layer with full power and full aft stick. He picked up a fair amount of ice. He was just emerging from the top of the clouds with full power and minimum flying speed, when he felt the back end of the airplane start to sink and the propeller sound starting to change. He thought the main wing was stalling, so he dumped the nose. He lost about 1000 ft. as he was picking up flying speed. He then climbed back up through the clouds at best rate of climb speed. After awhile on top the ice melted as the temperatures increased.

Our guess is that Chris might have picked up enough ice on the main wings to shift the c.g. much farther aft, and/or change the airfoil shape enough to start a main wing stall. The good news is that he was able to effect a recovery with full power and nose down elevator. This is the first reported instance of a suspected main wing stall in the Cozy. The lesson here is to not go to full aft stick and minimum flying speed when near, at, or aft of the aft c.g. limit, except during your initial flight test at high altitude wearing a parachute, and then do not violate the aft c.g. limit published in the Owners Manual!

EMERGENCY BULLETIN (Central States Newsletter)

"Fuel Cap Loss Causes Two Fatalities"

I felt the need to issue this, first ever, Emergency Bulletin after an accident in a Vari-Eze. Emory and Dottie Greer were fatally injured Sunday June 13 departing from Johnson County Industrial airport outside Olathe, Kansas.

"Initial reports seem to agree that the Vari-Eze, 222EG, broke ground and began a normal climb. Shortly thereafter a surge was heard and the aircraft rolled 45 degrees to the left and dropped 30 degrees nose down. It impacted the ground in that attitude.

"Impact area investigation found all airframe pieces except for part of one prop blade and the right fuel

cap (Thermos - expanding O-ring style). It was assumed the cap had come off and gone through the prop shortly after rotation.

"Further search revealed missing pieces of the prop and the lift tab from the missing fuel cap near the intersection of runways 4/22 and 17/37 back on the airport.

"The conclusion drawn by me is that the fuel cap lifted off the tank as the wing started to produce lift and was struck by the prop. The resulting prop blade failure caused excessive vibration. The vibration caused the pilot to cut the power. The aircraft was at departure weight and probably lost airspeed rapidly with such a high wing loading and nose high attitude. The roll could have been initiated by the pilot in an attempt to get back to the airport while the nose down attitude might have been needed to regain airspeed".

"The sequence of events is not as unportant as how the fuel cap got off the aircmft and how dw could be prevented in the fumm on your aircraft".

"The accident involved a Vari-Eze which has three fuel caps located ***In Front Of*** of the propellor arc (The Long-EZ's and the Cozy's two caps are about 6" outside the arc, and the Cozy Mark IV's two caps are about 8" outside the arc)."

The Central States Newsletter goes on to speculate why the cap might have come off. It is possible that the lifter might not have been pushed down. This could have happened if someone other than the builder had fueled the tank. It is possible that the cap might not have been adjusted to put sufficient squeeze on the O-ring. This should be checked periodically. It was also suggested that if the O-ring is not lubricated (with vaseline), it will dry out and not grip the filler neck (We were not aware that this could happen).

Then the Central States Newsletter goes on to recommend the combination static ground and cap retainer recommended in the Cozy Newsletter 22-2 (July 1988) and also shown on page 21-8 of the Mark IV plans.

It is not only intended to retain the cap so it cannot go through the prop, but also provide the necessary grounding between cap, filler neck, and fuel inside tank. With a short piece of wire two alligator ciips, you can also ground the nozzle to the cap, filler neck, and fuel. If you are going to use this arrangement to maintain the cap, make sure you make everything strong enough. Last year we relied on the fuel truck driver to put the cap back on the right tank of our Mark IV, but he didn't push the lifter down. We didn't notice, and when we took off, the cap popped out, the braid broke, and the cap went flying. It did not go through the prop, because it was outside the prop arc. When we landed at the same airport awhile later, and noticed the cap missing, we notified Security, and they found it half-way down the runway. It was slightly abraided, but none the worse for wear.

OPINION #2 ON TRANSPONDER SHIELDING

Cozy builder Brian Heinitz sent us this reprint from the *AeroElectric Connection*, by Robert Nuckolls, entitled,

"Transponders and DME Antennas, A Health Risk?"

I've read articles with admonishments to builders of plastic airplanes to mount transponder antennas as far from the cabin as possible and/or provide shielding between the antenna and occupants. Aluminum foil applied under seat structures is recommended for very male concerns for protection of the 'family jewels.' The '200-watt' output rating of the transponder is often compared with the 600-watt rating of microwave ovens. While the peak power of your transponder may be 200 watts, the output occurs for microseconds at a time and only when replying to a radar interrogation. Average power at the antenna is only a few watts during pulse time. The 600-watt rating of your microwave is an average power directly related to an ability to cook. Your transponder can't warm anything up, much less cook it. At Boeing in the 60's we worked on radar sets with 200,000 watts peak output. Average continuous power to the antenna was under 50 watts! I've not seen any studies in the engineering literature that confirm a hazard from this source. Energy densities as low as 5 milliwatts per cubic centimeter have been suggested as a threshold for harm. Power delivered to any body parts from above a DME antenna ground plane will be well below this level. Most of the serious proponents of shielding take the "better safe than sorry route." Shield your buns if it makes you feel better, but don't lose any sleep over it if you don't.'

EPOXY UPDATE

Safety-Poxy will continue to be available, and can be used safely if the proper precautions are taken. Nevertheless, Hexcel expects to market a re-formulated Safety-Pox which doesn't contain MDA. In the meantime, our licensor, the Rutan Aircraft Factory, considered it advisable to qualify an alternate epoxy resin by a different manufacturer, which doesn't contain MDA. It is PR2032 and the catalyst is PH3660-2. As explained in Newsletter #41, the new resin will require a change in your ratio pump and/or balance.

The new epoxy is colorless, and has a higher viscosity than RAE epoxies and Safety-Poxy II. It does have a higher glass transition temperature, however. We have tried it, and it seems to work okay, except for being a little slower in wetting out. We have had mixed reviews, so far, from builders. Some like it, some don't.

We will report on Hexcel's progress with re-formulation, and try to get the data needed to compare the properties of the various epoxies being used.

PUBLICITY

Congratulations, Tom Gross, for getting a picture of your Cozy printed in Kitplanes Magazine! You are the latest to win a free subscription to the Cozy Newsletter (Did you notice that we also got a picture of the plans model MK IV published?).

Both Kitplane and Sport Aviation reserve space each month for pictures and short writeups on completed projects. They (and we) encourage builders to send in a good quality color picture and short description of their completed airplanes. To encourage participation, each year Bendix-King will hold a

drawmg at Oshkosh and award one of the contributors to Kitplanes a brand new KX 99 Nav-com radio! Although not as impressive, we will award every contributor a one-year subscription to our newsletter. Get busy now, ya-hear!

Helen and Walt Suminski submitted pictures of their Cozy for publication in AeroCrafter m July, and will get a free newsletter subscription. Here is part of what they wrote: 'Building our Cozy was a joint project between my wife, Helen, and myself. We started construction m Feb. 1986, and completed it in Dec. 1988. It was first flown in Feb. 1989. Approximately \$30K invested and about 3,000 hours in building.

"Composite construction is unique in that it allows for the average person with a minimum of tools to produce high quality, high strength airworthy components. Instructions published by the designer, Nat Puffer, are excellent and if closely followed, will result in a very airworthy and exceptional flying aircraft. We chose to build a 'Cozy' because that's the only possible way we could get to own one. There just weren't any for sale. Our Cozy, named 'Cloud Nine' is everything we had hoped it would be, and a whole lot more. We wanted an aircraft that would get us over long distances from coast to coast. One that was fast and inexpensive to operate. One that had a range of over 1,000 miles and capable of 18,000 ft. Easy and safe to fly and would prove to be a good investment. Considering this list of criteria, we really didn't have any other choice but the Cozy. In the past four years, we've flown from Maine to Oregon; from the Gulf of Mexico to Canada; over the Rocky Mountains at 16,000 ft. (with Oxygen) and skirted thunderstorms in Ontario, Canada. The Cozy handles like a much larger aircraft and it is and has an exceptionally solid feel about it. Consider also that Helen is a very conservative licensed pilot that doesn't believe in taking unnecessary chances."

"In conclusion, we feel that we were very fortunate to have selected the Cozy as the plane to build. It has proven to be a very exceptional airplane. The more we fly it, the more we have learned to appreciate its fine qualities." - Walt Suminski.

FIRST FLIGHTS

We would like to hear about first flights of our builders. During the last quarter, the following Cozys flew their first flights:

1. J.C. Genette of Vannes, France flew his Cozy F-PRAG on the 10th of June, 1992. This makes at least 7 Cozys flying in Europe, with at least 3 more almost complete.
2. Charles Nunnelee flew his Cozy N86CZ to Sun & Fun and said it is flying great. He said he and Pete Jordan spent about 5000 hours over a 3-1/2 year period building it and was complementary about the plans.
3. Rick Lewis' first flight on Cozy N397CZ was 5/15/93, and he had 10 hours as of 6/4/93.
4. Jim Edwards in Prescott AZ has been ready to fly for some time, but no news as of now.
5. Ken Francis finished Dick Smith's Cozy Classic, had the FAA inspection, but the certification

was held up by a paperwork glitch.

6. Gilles Desgruelles, in Paris, wrote in April that his Cozy was complete except for final painting, and was expecting to fly in June.

COME ON GUYS! LET'S HAVE THOSE FIRST FLIGHT REPORTS!

COZY HOSPITALITY CLUB?

The following letter was received from the Pershings:

March 1, 1993

Dear Nat and Shirley,

At the Cozy banquet last August in Oshkosh, we volunteered to type up a list of Cozy builders who attended the dinner and mail each person a copy. We included a letter in the last newsletter thinking that perhaps there were others who would like to be included on this list so they can correspond with fellow Cozy builders or visit when travelling. Our address didn't get included with the letter in the newsletter, so call or write if you wish to have your name included. The list is typed and ready but we thought we would wait until the next issue of the newsletter comes out in case there are others interested in being included. We will include additional names and addresses if we are sent the following information: Name, address, phone number, which Cozy you are building or flying, would you be interested in a Cozy builder/flyer visiting you, and include \$1.00 to cover copying and postage.

Sincerely,

[Rex & Barbara Pershing](#)

8134 Buckridge

Cedar Falls, IA 50613

(319) 987-2235

BUILDER HINTS

1. [Nick Parkyn](#) has recommended the use of water-reduceable epoxy and polyurethane paints manufactured by : System Three Resins, Inc., PO Box 70436, Seattle, WA 98107 (800)-333-5514 or (206)-782-7976.
 2. Brock Mfg. has made the necessary jigs for a conical-mount for the Mark IV for either the 0-320 or the 0-360 Lycoming.
 3. When you order and receive epoxy resin, check the resin number. Lon Cooper ordered RAE and received Safety-Poxy.
-

MARK IV CHANGES/CORRECTIONS

OSHKOSH'93

Oshkosh '93 will start a day earlier this year, on Thursday, July 29th. As has been our custom, we will try to arrive early to reserve a row on the flight line for Cozys. We already have 5 or 6 Mark IV builders who are nearing completion, and it would sure be nice if one or more of them could make Oshkosh. We have reserved a dining room at Robbins again this year for a Cozy builders' dinner, but on *Saturday nite, July 31st*, at 6:00 PM. We can accommodate 50 or so on a first-come, first-serve basis. Hope to see you all!

We have also scheduled a Cozy builders' forum for Saturday, July 31st, 1:00 PM, Tent #3. We have been told that builders like especially to hear about the experiences of other builders, so we will have an open mic and encourage participation. Polish up your tall tales and speaking skills!

FOR SALE

1. Due to several price increases of material and services, I'm going to have to raise my prices on the fuel gauges by \$5.00, making a set of gauges cost \$35.00 including postage. I've had the same prices for 4 years and due to everything going up, I've got to catch up! Vance Atkinson, 3604 Willomet Ct., Bedford, TX 76021-2431 (817)-354-8064.
 2. Electric speed brake actuator. Compact. AR parts needed for installation, with instructions. \$250. Contact: [Wayne Lanza](#), 9425 Honeysuckle Dr., Sebastian, FL 32976. (407)-664-9239.
 3. Cozy project complete through Chapter 8, including landing gear, brakes, tires, original plans and Owner's Manual. Selling I have changed to the Mark IV. \$ 1,200 OBO. Contact: Kevin T. Reilly, (804)-851-0852.
 4. Rebuilt aircraft instruments, much less expensive than new, guaranteed. Contact: Howard Francis, 5631 S. Crows Nest Rd., Tempe, AZ 85283 (602)-820-0405. Look for us at Oshkosh at the Varga Enterprises booth.
-

NOSE GEAR RATCHET

Cozy builder Dr. Curtis Smith invented a little gem of a ratchet which locks the nose gear up or down. It is still available for \$38, which includes postage and packaging. No need to call, just send check or money order. This little device should be considered a "must" by all 3 and 4-place Cozy builder/flyers. Once you have flown with it you will wonder how you ever did without it. Contact:

Dr. Curtis Smith
1846 Sextant Dr.
Worden, IL 62097
(618) 656-5120

WANTED TO BUY

Looking for a Cozy 3 or 4 place! Complete or near completion. Ted I. Weitz (612) 926-5689.

LETTERS FROM BUILDERS

3/27/93

Dear Cozy Newsletter

Kathy and I enjoyed flymg N2TM to Punta Pescadero located in Baja California, Mexico. A beautiful 3,500' paved resort on the East Cape, 38 miles SE of La Paz, 805 miles SE of Brown Field, CA. The clear, warm water snorkeling was as good as I have seen in the Hawaiian tropical waters. One early evening we put on a mini airshow for the guests that had gathered near the pool. While flying low over the Sea of Cortez, we could see tide pools, miles of sandy beaches, whales and the eastern sky colors changing from deep violet and purple, to hues of glowing orange and red. A skyscaped sunset we will never forget. After parking the cozy back at the airport for another night, we were greeted with smiles, laughter and cheers from a very excited crowd. It was not easy to say good-bye the next morning, as we pre-flighted, fueled and, oh yes, don't forget to apply the 12" high temporary N numbers to the sides of the plane. Our next landing will be in the good old U.S.A. I wouldn't want to alarm our friends in Customs with our high-tech, stealth, border crossing Cozy.

Once airborne, we enjoyed the next 805 miles by zipping over islands and the coastal water dotted with sandy beaches rising to colorful painted desert bluffs. The 3-bladed Performance propellor kept us whirring along at 238 mph. With the auto-pilot engaged and soft stereo music playing, it was EZ to remember the big event of 2 years ago to the day. It was that flawless day, when the Cozy and I left the bonds of earth for our first flight. Upon completion of that flight, I taxied next to a Beachcraft Starship that had just completed the Customs process on arrival from La Paz. Gary, the pilot and his passengers seemed quite impressed with the Cozy, complete with a photo session and the usual questions: Did you really build this? It was a great day and we still keep in contact Meanwhile, still reminiscing at altitude We laughed while I said, "We can do anything a Starship can do, while saving \$4.6 million." After a normal descent and complying with instructions from approach control, we were cleared to land back home at Brown Field. The Customs process seems EZ after your 3rd flight. I'm always ready to go back.

Imagine, wearing shorts in mid-March while enjoying swimming in clear, warm ocean waters. To top it all off, try flying your own hand-crafted airplane to get you there! The Cozy loves to fly! We are just ordinary people that crave the adventure of doing extraordinary things until next time.

Todd & Kathy

4/25/93

Dear Nat,

My project #442 is nearly all in primer, all systems complete but for a checklist of a dozen items like running plug wires and the like. I hope to make the designer happy with an empty weight of under 900 lbs., but don't quote me. It has been a long very educational 4 years. The fact that is virtually completed seems unreal, no doubt the feeling will pass when we are at the airport. Vance Atkinson was in the area, and visited here. We spent some time in my shop, and after a good look over the plane, remarked that I was doing a good many things very similarly to what he had. I had to laugh, and tell him that was no coincidence. I've been copy cat building from Vance's plane for 4 years!

At this point I believe I should be very close to operations and flight by the last weeks in May. I will keep you updated and send a full report, with all specs on the aircraft.

Many thanks, God bless
Robin du Bois

2/21/93

Dear Nat,

Good talking to you earlier this week. Here's a check for a set of Mk IV plans. I look forward to getting started. Having flown B-52s for 12 years, I'm kind of fond of that number. Is there any way for me to get that serial number? Hopefully the Air Force will allow me to stay in Virginia (or at least in a warm climate) until finished. Please list my 3-place Cozy project for sale.

I've located another Cozy 3-place owner, Ray Hart, from Williamsburg, VA. Even though he thinks the original Cozy is great, he wishes he had started on the Mark IV. With luck on my side, I hope to complete the set of EZs in the area. The local EAA chapter already has a Vari-EZ, Long-EZ and Cozy. Now it's time for a Mark IV. Wish me luck!

Kevin T. Reilly

4/25/93

Dear Nat,

I've been trying to narrow down the kit plane I would be building. I was a little unsure about a prebuilt plane, but after talking to so many of the first-time builders of your Cozy at Sun & Fun in Florida, I heard no complaints about anything. I think I was one of the few people at dinner at the Red Barn who didn't order plans yet. I'll be completing my A & P license this spring and I'm already getting my garage ready. You were right when you said at the Red Barn that there was a lot of talent in that room, and a fine group of people. Looking forward to getting started. Say hi! to Shirley for me.

[John Wilemski](#)

5/25/93

Dear Nat,

I enjoyed meeting you at Sun & Fun, and appreciated the photo opportunity in the Mark IV. I am currently finishing Chapter 7. Everybody asks, "which end is the front of the boat?" Someday there will be wings!

For those Cozy Mark IV builders that want tee shirts, a company at Sun & Fun was selling Cozy Mark IV shirts, with a very detailed picture of the plane, some clouds, and the name "Cozy Mark IV". I missed my chance to buy at the show, but I ordered over the phone, they were very courteous and prompt. Contact: T Shirts by Applewood, Inc., Fletcher, NC. (704)-628-1710. Cost is approx. \$12.

Thanks for the design, and the Florida visit. Hope your stay was fun. Safe flying.

Steve Blank DDS

4/20/93

Dear Nat and Shirley,

Sun & Fun this year was quite an experience that I will talk about for some time to come.

Thanks for coming the full way to Florida and stopping by to spend time with us in Orlando. Of course now we Will expect to be seeing you around these parts a little more often (at least at Sun & Fun time).

The ride around the patch reassured me that the Cozy Mark IV was the right choice. I can't wait to finish so my family and I can go places that others can only dream of (like the Bahamas and of course Mesa, AZ).

Thanks for taking the time to create an affordable design for us family types. Also, when we were at the dinner, a yellow legal pad was passed around. I was going to take it with me but neglected to do so. Do you know what happened to it? If not, could you please put a notice in the next newsletter to that effect, because I would like to have it or at least a copy.

Another thing. I briefly talked to Shirley about the possibility of me offering various "Cozy" merchandise for sale to builders, so they can show their pride in being a Cozy builder. Items such as the shirt I wore to the dinner (which really caused quite a stir at the airshow) and various other novelties.

Of course in keeping with fair business practices, if the interest for these products was proven to be there, I would arrange a licensing agreement with you for the use of the Cozy name. Please write back and let me know your views. Thanks again for coming down to the show and visiting.

Sincerely,

[Bill Walsh](#)

(407) 695-3543

Editor. Bill thank you for arranging the Cozy dinner at the Red Barn in Lakeland. It was a big success. We get many requests from builders for Cozy merchandise, but do not have the time to make arrangements. We and our builders would appreciate it if you would take on this responsibility. You

sure don't need a License agreement from us! We can put you in contact with the people who make Cozy pins.

2/27/93

Dear Nat,

Greetings from Florida. I am happy to report that my Cozy is progressing at a reasonable pace, we're upside down again finishing off the strakes and belly. Hope to have the bottom in primer and back on my wheels by mid-March. The top of the strakes should go fast from there on. I've built leading edge and sump blister molds in my spare time and will be supplying parts to some of the local Cozy builders in my area (we have 6!).

My sales of the speed brake actuator kits are doing well. Have sold five kits so far and everyone seems to be happy with my efforts. Am also thinking of selling some custom bezels, a custom DG face glass, etc.

[Wayne Lanza](#)

5/25/93

Dear Nat,

Thanks for making the effort to attend Sun & Fun this year. It was very nice to see the plans-built MK IV with the new upholstery and the wheel pants, as well as to visit briefly with you and Shirley.

I would like very much to have your wheelpants made available through Feather Lite. I'm making slow but steady progress on my own project, but I'm very pleased with the results and am having fun in the process. Thanks for sharing the four-place plans with us!

Don Hanson

Dear Nat,

Hope you're all keeping fine! Enclosed are photos of my halted progress. Seated in the captains seat is my smiling son Glen - he turns 3 on Aug 13th. With comments like, "Daddy, when are we going to fly in the big aeroplane?", I can't but feel motivated to build.

I am making some glass parts for other projects to bring in much needed extra cash. *(Rego goes on to discuss in detail how expensive materials in So. Africa, and to ask me for suggestions on reducing costs).*

Do you know of anyone wishing to tour So. Africa? I will offer them a place to stay in Port Elizabeth in exchange for some well needed Cozy MKIV parts. We have an extra room which sleeps two.

Also I have a firewall forward offer - A Cessna push-pull complete front end incl. prop - excellent condition with approx 1300 hours on Engine. Mags, pump and all - R35000. The pump alone sells in S. A. new @ R25000.

I'll be comensing production on Cozy again around the 6th of June. Thanks for placing my name and

address in the newsletter - I've had one call so far. Kind regards.

Rego Burger, 18 LeNorne St.
Woodlands PE 6070, S. Africa

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