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COZY NEWSLETTER #62

July, 1998

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WHAT WE HAVE BEEN DOING

The weather this spring was worse than normal, because of El Nino, they say. For as many years as we can remember, we have had to fight our way through bad weather, either going to Sun 'n Fun, or returning. Last year we got stuck in Texas both ways. This year, Shirley said she was only going to fly in good weather. So we started watching the weather about 10 days before Sun 'n Fun. We had to sing in the "Messiah" on Good Friday, and it looked like the next day was the day. Sure enough, we flew all the way to Florida without seeing a cloud in the sky. We had a nice vacation in Kissimmee waiting for Sun 'n Fun to start. While there, we saw our first launch of the Space Shuttle.

We set up our exhibit space in front of the FAA building. Steve Wright (electric nose lift) supplied us with a gazebo and chairs. He had his nose lift demo unit on display, and Alex Strong brought his demo of his electric pitch trim. Wayne Lanza supplied us with a table (thank you Wayne). We saw many of our old friends, and made new ones. The Atkinsons, Wilhelmsons, and Strongs stayed with us.

The Cozy Banquet at the Red Barn on Sunday night was well attended. I think we counted 51. Bill

Walsh was "under the weather", so he was pretty quiet.

Chris Scida (and family) parked their Cozy Mark IV with ours in the display area, so people got to see a really great Cozy Mark IV. We aren't sure just how many Cozys showed up, because they kept coming and going, but we guess there were 15 altogether.

Monday night we attended the U.S. Aviator's bash. The food (barbecued chicken) was very good, and the band, "The Lost Patrol" was exceptional, as usual. We have never heard a "Dixie Land Band" as good as this, and they kept the place rocking 'till the late hours.

We were watching the weather each day, and toward the end of the week it appeared that we would have to leave on Friday, to avoid getting marooned for a whole week. We made fuel stops at Baton Rouge and Ft. Stockton. We had strong headwinds all the way home, heavy turbulence, and flew through a dust storm in Texas and New Mexico, but except for that, it was a good trip and we landed at Falcon Field just before sunset. The only thing wrong with living in Arizona is that we have to fly through Texas going to and coming from Sun 'n Fun (sorry, all you Texans, but that's the truth!).

ELECTRICAL SYSTEMS

Who would even expect to have an electrical failure? They seem to be so reliable, and many builders convert everything they can think of to electricity. Electric ignition, electric fuel gages, electric nose lifts, electric landing brakes, and the list goes on and on. Well, on our way to Austin, TX, we lost the side tone on our mikes. A short time later, we got a message on our GPS of low voltage. Sure enough, the digital volt meter in the lower left corner of the panel, which is hard to read, read 9.4 volts. My first thought was that we might lose communications, so I called center and asked them to alert the Austin tower that we would be landing there and might need light signals. When we arrived at Austin, we still had communications (thanks to our King com, which works great on only 9.4 volts) but guess what? We didn't have enough voltage to lower our electric nose gear. I had Shirley circle (she did a very good job) while I reached behind the panel to try to lower the gear with a socket wrench. But guess what? I had a cheap, 12 point socket which stripped before I was able to crank the gear all the way down. I could see through the little window that the gear was only part way down.

I called the tower and told them I was unable to lower the gear all the way, and they instructed me to land on a cross wind runway. Right after we touched down, the nose went down, we lost the bumper, ground off the little metal foot that mounts on the strut, and stopped really fast (we could have landed on the ramp). A Mooney had made a wheels up landing a short while earlier, so the tower expected the worst. We were greeted with a crash truck, an ambulance, and a police car, and quite a crowd of people. I felt pretty stupid trying to explain to people that the Cozy was designed to land that way, and nothing really was wrong. No injury, no damage. I reached in my tool box, got out a 6-point socket, lowered the nose gear all the way, and we pushed our Cozy over to the maintenance shack. No one was there (it was Saturday afternoon, and the mechanic was still attending to the Mooney on the other side of the field). We dropped the lower cowlings, and I didn't know what to expect. But it was obvious. The simple little wire to the alternator field had fatigued in the breeze (it must really be breezy in there) and broken at the spade connector. I reconnected the lead, reinstalled the cowlings, fueled up, and got a jump start. For a

couple of minutes, the alternator was charging at about 35 amps, but it soon settled down and the voltage climbed back up to 14.4 volts, so we took off and went on our way. So much for electrical systems!

Interestingly, when we landed in Kissimmee FL, a pilot of a factory built discovered he had left his master on over night and his battery was flat. We suggested (from recent experience) that he get a jump start and let his battery charge while he was flying home. He was afraid, and decided to stay overnight while the FBO took the battery out and put it on a charger, and then put it back in again. That must have cost him! Oh, well!

At Kissimmee I called Steve Wright and asked him to bring an extra metal foot, which we installed at Sun 'n Fun, and after returning home to Mesa, I installed a new bumper under the nose.

Just on the chance that something like this might happen some day, when I built N14CZ, I buried two layers of 1/4 in. birch plywood and two layers of 1/4 inch aluminum, and a few extra layers of glass in the nose immediately under the bumper (that is why we call it composite construction), so there was no damage at all to the nose, but I have used up my last half hockey puck.

GIMME MORE FUN (VANCE)

Getting to Sun 'n Fun, OR, can you spell BAD WEATHER? Putting about 25 hours on our COZY III in the process of slogging our way to Florida, we had a few glitches. I had not flown the Cozy in the preceding 3 months due to a busy work schedule and consequently didn't get to test fly the latest mod (more than 15 min.) before we left on our first 5-hour leg, so here is how it went.

After reading about the dimple tape in sport aviation and talking to the inventor, I decided to buy my own tape and punch the holes in it ala homebuilt. The first thing I found was it took a month to get the 17 thousandths thick tape from 3M (Nat no longer works there). They charge extra for one roll when they have to "break a box" This cost about 80 bucks for a 100 ft. roll. I then proceeded to punch in all the little holes using a gasket punch, this took a month. Just kidding! It really only took about an hour and a half. Piece of cake for anybody who's built a composite airplane and put the finish on. The application process took a couple of hours (where did you put it, Vance?) and the bottom line is the day we left for Sun 'n Fun (via a lot of other states) was the first test flight. I flew for 15 minutes and noticed nothing horrendously wrong, so we loaded up and left for the East Coast.

During the short test flight I did notice a couple of other things amiss and they were, my fuel flow was reading a tad high (about 2 gallons per hour) and my red warning light on the Northstar was on the whole time. I contributed the light to a zippy vertical take-off and didn't have a clue to the fuel flow. After landing back at home base, I refueled and taxied to the hangar to await my wife. I then noticed the red (low SNR's) light was out. OK. I pulled the lower cowl and all the fuel fittings looked good with no fuel stains in sight. We run a 28 psi fuel injection so connectors and lines are very important to be leak free.

As we blasted off for the Coast, I again noticed the red light and after 30 min. I still could not get it to

go out. I thought, "jeez, here I am starting a trip going all over the place and I'm not going to have any long range nav". Just my luck. I started gathering all my charts and the ol' trusty whiz wheel and muttering something under my breath like, "why me", and a few other things. After an hour of thinking about the problem and doing several diagnostic checks noting all the SNR's were low, I started turning off equipment one by one. Viola, when the transponder went off line, the entire signal to noise ratios took a big jump up! So now I had a choice between showing up on somebody's scope or navigating! Some deal!

After 4 hours of alternating transponder and Loran (yeah, that's right, I said Loran) both units started functioning normally. After landing I checked all the connectors and harnesses and really couldn't find anything wrong.

All the while this was going on I kept a wary eyeball on the tach. Sadly noting no change in RPM or speed. At first I thought the dimple tape might be causing the high fuel flow but by the time we arrived at Tri-City TN, we were showing higher and higher reserve fuel and when we landed we had 15 more gallons than the computed numbers showed. Definitely something amiss there. Later, after the 20th hour of flight, I noticed some of the dimple tape starting to peel off, so I just removed the rest of it. On the next leg I noticed sadly, no change. I think that if you have relatively efficient airfoils, you will not benefit from this type of vortex generators. Indeed, later on Jim Price had the chance to test some EZ type airfoils in a wind tunnel and the dimple tape was the worst as far as drag goes. The best? Simple vortex generators everybody has been using all along. I don't recommend this tape to cut drag, but I am going to put some on the gear legs since I have it made up but haven't flown yet.

The real problem we faced was coming out of Tri-City TN and just shortly after lift-off it happened. At about 200 ft. the nose retract mechanism let out a loud bang which was reminiscent of the previous big bang 2 years ago coming out of Sun 'n Fun and mostly resembling the big bang that started the universe. It was loud! The electric motor was turning but nothing was happening. The nose gear just hung there, not up, or down. Just swinging in the 130 kt breeze. We decided instead of going back and clogging up the runway causing numerous jets big time heartburn, we would continue on our one hour trip down to George and Lucy Walters (who have a very nice Long EZ) airstrip in the Carolinas. Conveniently, they were expecting us.

As luck would have it there were no aircraft in the pattern and we made a nice smooth landing, until the gear collapsed. We had a very short stop with a lot of smoke and noise. If you ever have to stop the plane from going off the end of the runway, or you are going to hit something, retract the gear! **YOU WILL STOP!**

We had plenty of help getting the plane to the hangar, which was 50 yards away. Damage consisted of a 6-inch diameter flat spot where the snubber used to be, and no damage to the gear leg, wheel or casting. George had all the epoxy, cloth and foam on hand so the repair took all of 4 hours. The culprit was a broken weld on a small one-half inch square piece of metal that keeps the spring compressed. This happened to us 2 years ago and I relayed a fix to Steve Wright, who now makes these units. Mine is a prototype that Steve did not make and I thought my fix was sufficient. After the first incident two years ago, it was decided to make the piece in question slightly different and it was offered to me but I thought my fix would be OK.....Wrong. No other units have had this failure. I love the test mode.

I called Steve Wright (poor Steve) and asked him to bring a spare part with him to Sun 'n Fun. I carry a spare spring substitute with me (read, "solid bar stock") and bolted it in place and changed the wiring

around slightly (the down-lock switches were toast) and after 4 hours of work, we were back in business. Try that with a Spam can retract. When Steve arrived in Florida, he had a slightly better spring unit and asked if I would try it instead of the old unit. This new unit uses the same spring but the internal slider unit uses round tubing instead of square, the material is about 30 % thicker, and it has less parts. Since my unit never did have the nifty up-down lock switch system that Steve sells with his, I sent mine in for the upgrade. I have just finished installing the new retract unit and will report on its performance next newsletter.

By the way, if you ever have to fly with the nose gear down, you only lose 10 kts. Our nose strut cover is fairly wide so we get a lot of drag. No, the engine didn't overheat, but there was a noticeable rumbling and buffeting with that stick hanging down in the breeze.

Vance Atkinson

STATIC LOAD TESTING A CANARD

David Barthelmes used Epolite 2427 Epoxy in building the GU canard for his Cozy III. It was built strictly according to plans (no "hard shelling"). Even though Dave had not experienced any poor peel strength with this epoxy, others had reported it, so he decided to conduct a static load test. His primary concern was with the secondary bonds (wet layup over cured) between the shear web, spar caps, top skin, and bottom skin (where they wrap around).

He built a test rig to support the canard upside down from the 1/8 inch thick lift tabs, similar to the way the canard supports the fuselage in flight. He made a conservative estimate that the fuselage provides the same amount of lift as it does on a Long EZ (15%), and calculated that at a gross weight of 1,500 lbs. and 4.7G's, he would have to load the canard with 1,060 lbs. total weight. He did this by loading 106 Ziploc bags with 10 lbs. of sand each and stacking them in 4 rows on each side of the canard. He found that the canard deflection at the tips was linear with loading, and at 4.7G's (it was actually higher than that, because the fuselage of the Cozy provides more lift), the total deflection was 4.06 inches. He reported that the canard showed no signs of distress, nor were any sounds noted from within the structure, and after removal of weight, deflection returned to zero.

If my memory serves me correctly, when Burt Rutan loaded a reject Long EZ canard to destruction, he got up to 14 G's and a deflection of 12 inches at the tips before the canard failed. This would indicate that Dave loaded his canard to only about 1/3rd of the ultimate strength. Both Dave and Burt's load tests were with lift tabs 1/8 inches thick, and the lift tabs didn't fail, for those of you wondering if 1/8 inch thick lift tabs are thick enough.

It appears that you can judge the number of G's by the deflection of the canard tips, a little more than 1 G per inch deflection.

FIRST FLIGHTS

There have been 4 confirmed first flights this last quarter, maybe one or two more that were un-reported, and maybe a couple of more by the time you get this. Confirmed are:

Tony Rothman, March 9, 1998

Val D'Oliviera, March 29, 1998

Larry Aberg, February 7, 1998

Ken Reiter, April 19, 1998

Tony Rothman writes:

Dear Nat & Shirley, 3/24/98

Thank you very much for a fine airplane. VH-COZ now has around 62 hours on it and we are extremely happy with its performance.

Recall when Brenda and I met you at OSH '87 and you asked what we were doing there. I said we had come to meet you, see your aircraft and buy plans. You took one look at my diameter and told me that before I spent my money I should be aware there was a 360 lb weight limit in the front seat. I said (small) Brenda would have to lose some weight, and I do not think you appreciated my humor. Anyway, you did me a favor. I lost about 25-30 lbs. I ought to lose some more too, but losing weight is harder than building an aeroplane!

The Australian version of OSH is Mangalore at Easter, and of course we have all the same kinds of judging and award presentations. VH-COZ was judged "BEST COMPOSITE AIRCRAFT" this year. I shall send you a photo when we receive it.

Vance Atkinson was out here in the Challenger jet a few weeks ago. He took a photo of our Cozy parked down by the beach and said he would post it to you.

I suppose most builders make some changes. COZ has an IO-320-D1B engine, 3 blade MT constant speed prop, and Lightspeed Engineering electronic ignition in place of the right magneto. The aircraft is set up for IFR with King radios and a Garmin GPS-COM which is approach certified. Also a Shadiin altitude alert system.

Genuine 75% power TAS is 173 kts at 8000 ft. and 1600 lbs, but more importantly, it climbs like a home sick angel. At gross weight sea level, rate of climb is over 1400 fpm, genuine and sustainable. No CHT overheating at all even on long climbs. Oil cooler is bracketed off the spar over the lower left cowl and did run hot until I enlarged the exit air hole and baffled the cooler to the cowl with foam rubber strips. We are considering an oxygen system to further improve our options. Thanks again for a fine airplane. Will let you know of its travels and performance.

Tony Rothwell
Australia

Larry Aberg writes:

Hello Nat,

It is my privilege to inform you that Cozy Mark IV N180CZ took to the skies on 2/7/98. What a wonderful feeling it was, hard to describe. The first flight was limited to checking out flight controls. I made the first approach to landing at 100 kts which was too fast and floated the entire length of the runway. On the third approach at 80 kts., the MK IV settled down and I was quite surprised how easy this Cozy is to land. My thanks go out to Gil Hutchinson, who offered his support during the last year. Also, thank you Nat for designing and supporting a terrific airplane.

Being a low time pilot, I was a little hesitant to take the big one without getting a check ride in another MK IV. Due to work schedules, a check ride did not work out. One thing which gave me a lot of confidence to proceed with the first flight was rotating the MK IV keeping 3-5 ft off the runway while checking out flight controls. By adjusting rpms, I was able to keep the plane flying relatively slow. I proved the plane could fly and felt it would be better to find out any problems while still in a relatively safe environment. I conducted these maneuvers only after I was comfortable with high speed taxi tests and felt I could control the MK IV under any circumstance.

Larry Aberg
Vancouver, WA

Ken Reiter posted on the internet 4/23/98:

Hello Guys,

My first flight was 4/17/98 at 13:30. First three flights (1.6hrs) have proceeded without issue to date! After 10 years, the only thing I can say is GET IT DONE!!! A BIG THANK YOU TO:

Burt
Nat (Answered more than endless questions)
Vance Atkinson (Answered endless questions)
Ken Francis (let me shoot 7 landings in his Cozy)
Debora (My wife – understanding and supportive)
Ron Gowen (weekly calls to keep me moving)

On 5/18/98 he posted on the internet:

Build as fast and correct as you can. Nothing like early morning over this great country's landscape in a plane that you built. N241KD now has 11 hours and have only minor adjustments ongoing. Thank you Nat! As a LOW time pilot (100 hours total) the plane is GREAT to fly and the landings are getting smoother. They are NOT hard, the speeds are just higher than the 150 that I learned to fly in. Nat, you and Burt have given us this REMARKABLE plane to build and I am thankful to you for continuing to support us and give us this ABILITY. It can not be easy, but please continue!!

Thanks,
Ken Reiter

\$\$\$\$\$\$\$ 4 U - \$100 OR STRONG PITCH TRIM

EAA members, and readers of Kitplanes magazine love to read about what other builders are building and flying. We have a lot of builders who are flying, but never sent in pictures to any of the magazines. Maybe they didn't think it was worth the effort. So we decided to increase the ante. When we mentioned this to Alex Strong, he suggested we offer builders a free "Strong" electric pitch trim, or, if they have already purchased one, \$100.00, for any pictures and descriptions or articles published in Sport Aviation or Kitplanes Magazines. This will apply as of now, and will apply to Mike Davis, who's Cozy was pictured in June '98 Sport Aviation. Tell us what you want, Mike.

Let us know when you submit (so we can watch for it to be published) and let us know what you wish to receive. Submit your pictures and write up to:

Publicity Addresses

AWARDS

At Vance's suggestion (he sure thinks up a lot of ideas), we had some very nice plaques made by Cozy builder/artist Lon Cooper to honor those builders who have passed the milestones of 500 hrs. and 1000 hrs. on their Cozys. These are really attractive, and truly a work of art, suitable for mounting on the headrest of your airplane, or in your trophy case, or on the wall of your office. 500 hrs. gets you silver, and 1000 hrs. gold. We would like to award these at Cozy dinners at one of the fly-ins. Let us know ahead of time if you qualify.

ARLINGTON '98

Arlington Fly-in is scheduled for July 8-12. We plan to attend, God willing and weather permitting. Eric Westland, who's Cozy Mark IV is almost ready to fly, writes:

We will be happy to host the Cozy Dinner again at the Arlington Fly-in. We have always had it at our home, but this year we may have it in our hangar at Arlington if we get the plane moved up there in time. So, for planning purposes, we would like people to RSVP to us if they think they will be able to make it. Those doing so will receive specific information on the dinner the week end before. For people deciding to come at the last minute, we will have information for you distributed at the fly-in, or else contact us. As usual, we will have the dinner on Friday evening, July 10th, starting at around 6pm. As in

the past, the cost will be just what it costs us to put it on. It's always been a very good time and well attended, we look forward to meeting new friends and reacquainting with old ones. Eric and Vicky Westland, (425) 513-0941 or ewestland@altavista.net

OSHKOSH '98

Oshkosh '98 is scheduled from July 29 thru Aug. 4. We are planning to exhibit there again this year in the same exhibit spot as last year, that is, at the South end of the North exhibition building. We have signed up for a forum on Friday afternoon, July 31, Tent 6 at 1:00PM. Bring your questions so we have plenty of things to talk about.

The Cozy banquet arrangements are being made by Daryl Lueck and Kim Schallhorn (<mailto:kimschallhorn@ultracom.com>), same as last year. The banquet will be Friday evening, July 31, at the Ramada Inn, on the East service road of Hwy 41, one or two exits (I can never remember) north of the airport. Meet at our airplane in the afternoon to volunteer or ask for rides Try to arrive at the Ramada early at or before 6pm (to avoid the traffic jam). Buffet dinner at 7pm (the food has always been very good). Stories during dinner, introductions, and slide show. The speaker will be about 8:30ish.

Now get this! The speaker will be a representative from Delta Hawk! They are the ones developing a V-4, 200hp, water cooled, diesel aircraft engine! They are hoping to fly one to Oshkosh on a Velocity. Who knows, they may even be accepting orders!

Last, but not least, there will be door prizes!

Pricing hasn't been determined yet. Kim and Daryl ran a little short last year because the bar bill wasn't high enough. It will be affordable, for sure.

The Homebuilders picnic, sponsored by the EAA is on Saturday night, and that is also something you shouldn't miss. There were a lot of good speakers (including Paul P.) last year.

COPPERSTATE FLY-IN

Copperstate Fly-in will be in Mesa, AZ October 8-11 at Williams Gateway Airport, which is about 10 miles from our home. We have extra beds, and can accommodate couples on a first come basis. We had a Cozy banquet at Anzio's Landing, at Falcon Field, which was well attended, and we will probably do the same thing again this year.

EPOXY RESINS

We still get occasional questions about epoxy resin. The list of approved epoxy resins was published in Newsletter #56-6. Since then we have also approved the two German resins L335 and L285 (see Newsletter #61) which are being imported into this country and stocked at both Aircraft Spruce and Wicks. Our favorite epoxy was the original RAE, but if we were starting a new airplane now, we would probably use L335. It has the advantage of being able to mix the catalysts to obtain any pot life desired, as well as having the same ratio as the new EZ Pox (pretty much the same as the old Safe-T-Poxy). All epoxies, as far as we can determine, are inert to fuels

ENGINES

We had some disturbing news from Larry Aberg, about the rebuilt engine he purchased. He writes:

"I feel very fortunate to be around to inform other builders about my experience. If it had occurred early in the test program, I'm not sure I would be here!!! With about 5 hours and 30 landings into my test program (and 14 hrs on the engine), I had an engine failure. I had taken off as I had done in the past and climbed up to about 5,000 ft. and leveled off at 150 kts. The plane started vibrating severely and would not respond to any control inputs. The canard was deflecting several inches due to the vibration and I thought, "What have I got myself into?" Needless to say, this was the scariest situation I have ever had. I promptly reduced rpms, thinking I had lost a prop blade, and the vibration subsided. I was sort of relieved and made a turn to the airport. I was about 6 miles out at the time. I increased the throttle to see if I had power, and this time there was no response. I called in and declared an emergency. Before this incident, I thought I could control N180CZ in any condition, and now I was going to find out. I made it to mid-field at about 2,000 ft., and entered the traffic pattern. People on the ground said my approach looked normal. It wasn't. I landed without incident. The touch and gos I had been doing the day before paid off. On the ground my engine was still idling, very rough, but would not increase rpm.

After shut down and inspection there was oil dripping out the exhaust pipes, and also pouring out the air intake scoop. Upon pulling the lower spark plugs, 2 of the cylinders produced enough oil to make a 2 ft. dia. Oil slick on the hangar floor. There was so much oil, the plugs could not fire, causing the engine to run unbalanced during flight.

Upon tear down of my engine there was a "gritty" oily substance found everywhere inside the motor which was analyzed by a lab. This substance turned out to be glass beads, and significant amounts were present. All the internal engine components had been bead blasted and not cleaned prior to assembly. The main/rod bearings looked as though someone had taken steel wool to them. The crank was severely scored at the center main bearing. The main bearing to crankshaft tolerance was never checked.

Two engine shops conducted a complete inspection of the engine and were amazed at what they found. The piston rings were so badly grooved, they were most likely used. When examining the piston skirts, one could visibly see the glass bead material imbedded in the piston. The complete valve train

components were assembled with out of spec parts. In fact, there is not one valve guide, valve spring, retainer, rocker shaft, bushing, etc. reusable. The two shops said they had never seen parts so bad. This engine had 14 hours of running time on it since start up.

This engine shop was advertised in the Cozy Newsletter. The engine was said to have been built from used parts but still within factory specs. I paid Dan Brown in Tulsa OK \$9,500 for it in 1994. When I told Dan about my problems, he told me someone must have sabotaged the engine. If Dan Brown has assembled an engine for you, I recommend a tear down and inspection. Then you will know for sure what you have. Safe flying to all,
Larry Aberg

Editor: Upon learning of Larry's experience, I called Dan Brown. He told me he had supplied many engines, and that this was the first complaint. I asked for the names of all Cozy builders he had supplied engines to. He gave me 4 names. Mark Beduhn was one, and I knew he was already flying. Since this subject was being discussed on the internet, Mark published the following letter:

I also bought an engine from this engine builder, and I heard about this problem. I can't comment on the experience of anyone else, but I have 120 hours on my engine, and have had only one problem. The fuel pump diaphragm developed a leak. I called the rebuilder, told him about it, and he promptly mailed me a new fuel pump. Again, I can only report on my own experience and I have been pleased with the engine and the service that I have received from the seller.

Mark Beduhn
Cozy IV N494CZ

Editor: I asked Mark if he had sent samples of his oil in for analysis at each of his oil changes. He said he had not. I suggested he do so at his next change and see whether the silica is within normal limits (silica is always present).

I have no reason to disbelieve Larry Aberg, Dan Brown, or Mark Beduhn. All I can suggest is that everyone, whether they have purchased a new, rebuilt, or used engine, change the oil after the first couple of hours and have the oil analyzed to make sure it has no abnormal silica or metal content.

BUYER BEWARE

This would have been an apt title to the previous subject. Gene Davis writes:

A few months ago I wrote to praise the benefits of the Digifly equipment I had purchased for my Cozy Mark IV. I had chosen to use Digifly's integrated moving map and engine management system. In fact I was so pleased with the equipment that I had become a rep for them and shown the units at the Copperstate Fly-in in October. In testing the equipment prior to starting the engine I found significant errors in the temperature and pressure sensors. The problem proved to be in the data acquisition unit (black box). I have spent three months and many, many hours attempting to get the problem resolved with Digifly. They have been extremely unresponsive to my pleas for help. After I returned the unit to

them they eventually found that it had been manufactured incorrectly with the wrong parts. Another builder who had purchased this independently of me also experienced the same problem. Even after finding this problem, Digifly has not replaced or returned my unit. I feel any responsible and credible company would have replaced my defective unit immediately from stock which they apparently do not have. I have notified them that I am no longer representing their equipment and am returning all the equipment I have since it does not work as advertised. I had a verbal agreement from the U.S. rep to refund my money, however, he now informs me that he must wait for word from Digifly main office and they are unavailable once again.

I have since ordered other equipment for my Cozy Mark IV and will install it as soon as it arrives. My project is very near completion and this has certainly caused undue delay. Anyone who wants further information can call me at (602) 671-7355 or e-mail me: <mailto:g-c-davis@juno.com>

Gene Davis

BUILDER HINTS

(No plans changes this Newsletter)

I learned a long time ago that it is not necessary to paint an airplane in a spray booth, or even a hangar. You can paint outside, which is better for fumes and overspray anyway. Early morning is best for least wind and bugs (they are still asleep) If you pick up any dust or bugs, they are easily removed when you wet sand with 1200 grit and up, and then you buff with 3M buffing compound for a nice, flat, shiny surface. I didn't try it with the Mark IV, but we painted the bottom of our Varieze by tilting it back on the wheels and prop hub extension.

Use a heavier gauge than necessary for the alternator field wire, and make sure it is well supported all the way to the alternator, to avoid fatigue of the wire (and electrical system failure) at the spade connector.

For those of you installing fuel injection--Larry Aberg says that when the engine stops, fuel is vented from the injectors. If the injectors are installed in the bottom of the cylinders in the primer ports, fuel can drip down on the exhaust pipes and cause a fire hazard. The solution is to buy injectors with shrouds which collect the vented fuel and dump it overboard. These are available from Airflow Performance at (864)576-4512.

Dave West writes: I was floxing the longerons using a tongue depressor and making a mess, when my wife made a suggestion that I put the flox in a bag and dispense it like cake frosting. It worked great, fast with very little waste or mess. Put the flox in a freezer bag, work it to one corner, put a twist in the bag, then cut about ¼ inch off the corner. Dispense by squeezing the bag.

Marc Pichot writes: An old mechanic who worked in the stainless steel industry told me something I tried which is working very well. Would you like to drill or saw stainless steel without wearing your

tools and making the work somewhat easy? Grease a clove of garlic on the teeth of your saw or on the tip of your drill bit! I am using this clever way, because it works!

FOR SALE

1. 2-1/4 inch G-Meter, fresh matt white dial and needles. Cageable. \$200. Vance Atkinson (817) 354-8064
 2. Rebuilt aircraft instruments, much less expensive than new, guaranteed. Contact: Howard Francis, 5613 S. Crows Nest Rd., Tempe, AZ 85283 (602) 820-0405.
 3. Cozy builder, Bill Walsh, makes tee shirts and sweatshirts in various colors and adult sizes. They have a picture of the Cozy Mark IV on the front and back He may have other items, such as jackets, caps, and pins. Contact him at PO Box 160884, Altamonte Springs FL 32716. Tel(407) 695-3543.
 4. Cozy builder Wayne Lanza supplies an electric speed brake actuator kit with all the parts needed for installation, with instructions for \$275. He now has a switching and breaker panel for the Mark IV. It is similar, but not identical to the one we had made for our plans model. He is using the highest quality DC switches and circuit breakers, and pre-wires the panels, making the rest of the electrical system installation very EZ. Cost is \$425. We heartily recommend his products. Contact him at: 9425 Honeysuckle Dr., Sebastian, FL 32976 (561) 664-9239.
 5. Vance Atkinson supplies fuel sight gauges. They are a clear bubble with a white background. \$35 per set. Contact him at 3604 Willomet Ct., Bedford, TX 76021-2431 (817) 354-8064.
 6. Steve Wright is making electric nose-lifts for the Cozy 3 and 4 aircraft. It will raise the nose with full fuel and baggage and at least one person sitting in the front seat. We have installed one and like it. Contact him on (616) 373-8764 for pricing.
 7. Alex Strong is making a neat electric pitch trim system. Cost is \$175. We have installed one and like it. Contact him at (619) 254-3692.
 8. Featherlite (see "Authorized Suppliers") makes many pre-fab parts for the Cozy 3 and 4, including pre-cut wing and canard cores. We have used all of their parts and can vouch for the quality. They have also taken over the manufacture of propellers from Bruce Tift's estate. These were good propellers, with a urethane leading edge, and we are pleased to see that they are available again.
 9. Cozy Mark IV project completed through Chap. 8 and some of Chap. 9. Very good workmanship. Asking \$4,000. Contact Steve Blank (561) 337-3377.
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LIABILITY

Most of you know that one of the reasons Burt Rutan stopped designing airplanes for homebuilders and selling plans was the liability exposure. He was sued many times. Even though he never lost, it took a lot of time, was stressful, and cost a lot of money to defend himself. He suggested to us that we should stop selling plans for the same reason.

We decided that if we had a good airplane, tested it thoroughly, had a good set of plans, provided good builder support, urged builders not to make changes, and to fly as safely as possible, maybe there wouldn't be any accidents people would blame on us and we wouldn't get sued.

<*Much text deleted per Nat Puffer*>

LETTERS FROM BUILDERS

9/30/97

Dear Nat,

Thanks for the plans, they look great!!! If you ever happen to come to the Miami area please accept my hospitality if needed. I live a few blocks from Tamiami airport (TMB) so it would be very convenient for you. My phone is (305)253-7452.

By the way, I wanted to tell you I fully support your quest <*text deleted per Nat Puffer*>. As an engineer working on new machine design, I fully understand your point and support you fully. You are in fact protecting what I most value about this project, your expertise. <*text deleted per Nat Puffer*>. I intend to fully take advantage of your effort to provide us with a safe design and safe componenets through your authorized supplier program and I communicate this to your suppliers. Please keep it up since most of us need it and appreciate it.

Again, thank you for allowing me to fulfill my life dream of building a composite canard aircraft and I'll meet you at Sun 'n Fun.

Christian Martin
Miami, FL

4/7/98

Dear Nat,

Thanks for the newsletter; its nice to keep up to date on the latest information.

My wife, Karen, passed away unexpectedly in October, so caring for my four-year-old daughter, Katherine, has set my spring '98 start time back a few months.

I still plan to build, but for now, the newsletters and the web site (both yours and Marc's) will have to suffice.

Have a great year, and keep up the good work. I know that I'm not the only one out there who appreciates the opportunity that you've provided for us.

Good luck with your legal battles.....I hope that justice will prevail. Thanks for your contributions to the Cozy builders forum.

Rick Besecker
Fresno, CA

Mark Beduhn was asked about his project on the internet. He answers on 3/31/98:

Even though I had virtually no fiberglassing experience, Nat Puffer's plans were so complete (even included detailed fiberglassing technique instructions) that I had no problems with the structure. Many people have asked me how I completed the project so quickly, and there are two primary answers:

I am a project engineer, and am used to scheduling work and anticipating problems. Before I entered my shop each day, I had the work planned out and knew exactly what I wanted to do. I never got to the shop and had to think about what to do next. When I got to a stopping point on one part, I moved to the next one with no wasted time.

I got up early every morning to work on the plane at around 3:30 am. I have been called nuts, crazy, workaholic, etc., but I just consider myself to be dedicated and focused. The reason I got up early was to get the work done, and still have quality time in the evening with my family. Having a wife mad at you for being in the shop every night is not a good thing.

I have also been asked about the hardest part of the job. There were two. The worst was finishing (filling, sanding, priming, painting, etc.) The other was planning out the electrical system. Once I had a system planned out it wasn't so bad, but you would be surprised how difficult this part is. I ended up using lots of terminal strips, numbered wires and documented everything on CAD. Now when I have an electrical problem (and they are rare), it is very easy to find the source and fix it.

Early flights were great! Vance Atkinson checked me out in his plane, and then I flew the first flight in mine. I had to fix the usual oil temp problems and balance the cylinder head temps, but overall it went quite well. To date the longest trip I have made was 300 nm. I have 90 hours on the plane now and wouldn't hesitate to fly it 1000 miles (in good weather).

As far as skill required to fly the plane, I don't think it requires anything special, but it is different. Speed control in the pattern is very important. It takes planning to get the plane slow enough to land. Normal flying is very fun because the plane is fast and responsive.

Mark Beduhn
N494CZ

3/9/98
Dear Nat & Shirley,

It's been almost a year since I started construction of the Cozy MKIV #589. To say that it has been enjoyable would indeed be an understatement. It's very gratifying to see the fruits of one's efforts take shape.

As you see from the photos, the tub is coming along. This includes installation of the sticks, rudder pedals, roll and yaw control systems, firewall, electrical conduits, nose lift, and landing light in the nose. I want to be able to use the landing light as a recognition light at any speed. The canard is fitted and the fill and sand to finish process is underway on it. Credit for the construction quality of the canard goes to a mutual friend, Dennis Oelmann. He truly did a wonderful job on it. I omitted the landing brake handle because I intend to use the electric brake actuator.

My goal for the rest of the year is to get the fuselage up on its gear and install the canopy, turtleback and fuel strakes. My electrical system and instrument panel is already designed. And I would hope to begin installation of wiring harnesses. My electrical system may be a little bit more than most as I intend to operate day/night VFR/IFR and have designed a multi bus system with that goal in mind. Thanks again for all your support with your design.

Rob & Carla Kittler
Canton, MI

Benoit LECOQ posted on the internet:

3/20/98

Hi from France,

I have the exact same garage door problem because I am building in a two car garage which indeed has a center pole and believe it or not, it is a damned solid concrete pole! I designed the garage myself a few years ago believing I would later build a Lancair kit. At the time I already had the info pack for the Lancair 360 and checked with it to see if I could take the bird out with the center pole. It was OK so I decided to go ahead and put in the pole, because two small doors were a lot cheaper than one big one.

Then I switched to the Cozy when I seriously considered building and I am very happy to have done so because of the marvelous design. Then there were several issues there once the strakes are done (both, because with only one strake done there is no problem getting the bird out).

My door is 8.2 ft wide by 6.9 ft. high. My calculations and simulations show that getting the bird out would be close to impossible; it would require extensive support building and would be a very high risk for the aircraft integrity. So I decided to cut the pole at some point.

So the next question was, Would I be able to finish the project in my garage? Would I be able to flip over the airplane inside the garage, because a lot of work needs to be done with the bird upside down., and would I be able to paint the bird inside the garage? On the first issue I was a bit wondering because flipping the bird like it is shown on Nat's newsletters requires a lot more height than what is available in my garage. So I tried with flipping it over doing a ½ roll instead of ½ loop. There you need to protect the end of the spar and the nose, but the height required is 10.2 ft. Believe it or not, but I had 10.3 ft in my garage below the roof.

It still requires to totally empty the garage (to get garbage out the way when doing the flip) and you need to be at least 7 to 8 persons to be extra safe for the fuselage (2 at the nose, 2 at one end of the spar, 2 at the other end and one for checking everything and giving coordinated orders which I did myself) but it indeed works. So I was able to finish all the strakes and the contouring.

I had to flip it 4 times (been twice upside down). It is a hassle to empty the garage, but the calling of friends is a good reason for a party after the flip and it is a lot better to have the bird at home and not if it is at the airport. I also have young kids and didn't want to get away from them long. They are getting at the flying age now as is my bird: this is called good planning ahead. A lot of reasons to keep the bird at home during building and accept the hassle.

Second problem: Painting. Well again I emptied my garage, did a very big paint booth by building a tent in front of the two opened doors and then I have closed it fully with plastic film. That was this week. Now I am ready to paint and it will be this week-end. I decided to have a professional come home and do it. He came by today and was very happy with the set up. I hope it will work out fine.

I will then go on and start final assembly. Everything is basically built and still in my garage. I hope to fly this year.

At the end I will indeed cut that damned pole out with support on the sides leaving enough room to roll the bird out on the wheels. My garage is not getting out on the street. It gets out in the garden which is fully closed by a wall and main entrance so there is not too much worry about leaving the garage doors open which I did fairly often when both wings are fitted to the fuselage. Happy building!

Benoit LECOQ
Soisy, France

Hi Nat,

Chapter 4 is now complete, and now that I've got a little glass experience, I am going to take a break to make some improvements on my garage/shop. My wife Jill and I also have come up with a deal, where as I finish a Cozy chapter, I do a decent home improvement type project on the old house.

I took all my Chapter 4 parts to work and weighed them on an accurate scale. Altogether they weighed 21.913 lbs. I decided to vacuum bag any parts that lend themselves to the process, as these did. They are built exactly to the plans (as will be my whole project), but just bagged to reduce weight and provide a clamping force during cure for a better laminate. I've found that so far I have had no voids or bubbles, and scraps I've checked will not peel apart without destroying the core in the process. Also, since the surface finish is that of the peel ply and not the raw glass, contouring should take less filler material. What has really surprised me about this is how easy and inexpensive vacuum bagging can be. I've heard stories that this would really slow me down and wouldn't be worth it, but it's really quite fun and I've saved several pounds already over what some of the guys on the net are doing. Anyway, I'm not trying to make converts, just want to let you know about my experience.

Greg Hilliard
Delavan, WI

12/3/97
Hi Nat & Shirley,

I finally finished my new house and am settled in. Now, after this six month distraction, I can get back to building my airplane. This summer I bought a customized O-360 (with IO-360 crank, cam, and rods), zero TSO. It cost \$14,400 for the basic engine with no fuel or ignition systems. It looks beautiful, and

the workmanship is impeccable (by Aircraft Engine Resources, in Iowa). I also bought an engine mount and electric landing brake actuator. Can't wait to get them installed.

Reid Siebert
Normal, IL

4/28/98

Dear Nat & Shirley

Hope this finds you well. The Navy has decided that I have spent too long in Charleston, so they are moving me to Honolulu.

I was forced to leave my fuselage in storage stateside, but brought enough tools and equipment to build some smaller things here. Space here is at a premium, but I hope to make some progress. I'll be stationed in Hawaii for the next three years, and would be happy to meet with and tour any Cozy builders that should take a break from the Epoxy and be in my neighborhood. I don't have room to put people up, but have a van to shuttle people.

Chuck Foster
Honolulu, HI
(808) 423-0109

5/3/98

Dear Nat,

Your comment, "Burt Rutan used to say that good pilots flew in the daytime and made love at night. I try to follow his advice." Is a timeless statement. It should be part of the MKIV plans.

In reading the FAR's, I find that a landing light is not required for night certification of an Experimental airplane. It is only required if for hire operation is planned, which we can't do anyhow. My DAR concurs. I will install a landing light later, but not for landing. It will be for taxi illumination only, since some airports, even big ones, do not mark taxiways very well. My prime concern with the night certification is to be legal for the dusk landings.

I followed your advice and painted my airplane outside in the elements. It picked up some dirt as the wind was blowing, but have found it easy to remove with 1200 grit wet paper and buff with #M compound to finish. I gave the top surfaces 3 coats of clear so there is plenty of material to work with.

Third EAA inspection today, final assembly, 4th inspection and taxi tests should begin within 2 weeks. Hope to see you at OSH. No more airshows until this machine is flying! Best to you and Shirley.

David Domeier,
Chesterfield, MO

4/27/98

Nat & Shirley,

Thanks for taking the time to talk with me about the Cozy MKIV. It must have worked because without realizing it, I found myself writing the check for Plans #678. I can't wait to get started. But first, I'm busy getting my "airplane factory" ready to go, which I'm sure you know translates into cleaning out the garage, throwing the junk away, and painting it. After 4 years of living in our house, my wife Gail, was impressed at how airplane plans could be so motivating.

Gail was also impressed that Shirley could tell that her horse was an Arabian just from my wallet photo. Gail was even more impressed that she had heard of the Bask bloodline. She is anxious to meet with Shirley and talk horses.

I've noticed that some of the newsletters do not list any changes or hints. As refined as the plans have gotten over time, I would assume that not every newsletter would have changes. For those with no changes or hints, could you please print the phrase "No Changes this Newsletter" next to the "Plans Changes" headings? This would keep a neophyte like me from thinking I've missed something.

Hope your trip home was uneventful.

Wayne Hicks
Hampton, VA

4/11/98
Dear Nat & Shirley,

I have been to see Bob & Angela Allen's Czy MKIV, which is well under way and have had a check out ride in Dave Machine's MKIII. Dave has agreed to be my inspector on the project, so I feel that I will be in good hands. Will keep you informed of any developments.

Brian Tutty,
Kent, England

4/14/98
Dear Nat,

I just returned from an around-the-world cruise on board the USS Nimitz, the majority of the time spent in the Arabian Gulf enforcing the various UN resolutions against Araq. We brought home all of our pilots and aircraft, safe and sound. We did have one incident where a fifty cent spring corroded and broke, causing the nose gear to hang up when the pilot tried to extend it. The pilot was forced barricade the jet (run into the barricade net). The pilot did not even receive a scratch, but the jet suffered over \$600,000 damage. We repaired it in less than 60 days, and the jet is again flying.

I was unable to complete any work on Cozy #352 while on board the ship and that was depressing. After a couple of weeks ashore, reuniting myself with my wife, I have again commenced work. I will not be setting any records, but I sure do enjoy the process of building.

Thank you Nat, for all the things you continue to do, both for the individual builder and the entire sport aviation population. Keep fighting the good fight, and we will listen. God bless!

James Callahan
Whittier, CA

Dear Nat,

At work I'm always receiving revisions and flight bulletins for aircraft systems, procedures, and regulations. Just last month, we were informed by the FAA that standard passenger weight has been increased from 170 lbs. to 180 lbs. A good incentive to exercise, and build light! Take care!

Brian Heinitz
Roseville, CA<

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