

[\[Newsletters\]](#)[\[Cozy MKIV Information\]](#)[\[Prev\]](#) [\[Next\]](#)

# COZY NEWSLETTER #52

## January, 1996

### Table Of Contents

- [WHAT WE HAVE BEEN DOING](#)
- [WEIGHT AND BALANCE](#)
- [PUBLICITY](#)
- [FIRST FLIGHTS](#)
- [ACCIDENTS/INCIDENTS](#)
- [OWNERS MANUAL MANDATORY CHANGE:](#)
- [CAUTION - RETRACTABLE GEAR](#)
- [CUSTOM SHOPS](#)
- [CANARD AIRFOILS](#)
- [THE COZY MARK IV MAIN WING](#)
- [VACUUM BAGGING](#)
- [MARK IV CHANGES/CORRECTIONS](#)
- [BUILDER HINTS](#)
- [FOR SALE](#)
- [WANTED](#)
- [LETTERS FROM BUILDERS](#)

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[Newsletter Info.](#)[Subscription Info.](#)[Authorized Suppliers](#)

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### WHAT WE HAVE BEEN DOING

We now have 500 sets of plans out for the Cozy Mark IV, out of 503 sets that we had printed of the First Edition. We have updated the plans and construction manuals and are printing the Second Edition, which we will be using to fill new orders around the first of the year.

This year the Copper State Fly-In, October 12-15, at Williams Gateway Airport, Mesa, AZ, was a huge success. Williams is a former Air Force base with three 10,000 ft. runways and acres of concrete parking ramp. Almost 1,000 airplanes attended and there were afternoon airshows Thursday, Friday, and Saturday. The weather was spectacular, not a cloud in the sky! We flew over there from Falcon Field (big deal, about a 10 mile trip!), had a commercial booth in a prominent spot on the flight-line, and there was much interest in the Mark IV. We went up on a photo shoot with U.S. Aviator, and gave a couple of demo rides. There were 5 Cozies there and we hosted the Strongs and Morgans at our home. On Friday night we had a banquet for Cozy builders at the Red Mountain Steak House and 31 persons attended. The food, ambiance and camaraderie were great! Hope more of you can attend next year.

As we reported in the last newsletter, we were interested in evaluating the Franklin 6A 350 C1 engine in our plans model for several reasons: It is a certified aircraft engine with a history of good reliability, and it is appreciably less expensive than a new 0-360 Lycoming, it has more horsepower but because it is 6 cylinder, it is very smooth running, and even though it is heavier than the Lycoming, it could be of

benefit to builders planning to carry heavy loads in the front seat, because it would let them operate at a more favorable c.g.

We ordered an engine from Atlas Motors and received it on 10/5/95. It had been shipped by air from Poland to the east coast and then by truck to Mesa (\$323). The engine is supplied bare, with no accessories. We purchased a light-weight starter, fuel pump, and exhaust system from Atlas for \$800, a light weight alternator from an auto salvage yard for \$60, an Air Wolf spin on oil filter assembly for \$259, and acquired a set of 6399 Slick mags. The latter required a slight modification to fit the Franklin. With the help of [Jack Wilhelmson](#) who did the stress analysis, we designed the necessary bed-type engine mount, and Tom McNeilly built it. The engine mount is hinged at the bottom so the engine can be very close to the firewall, but easily swung down and away for maintenance on the accessory case. We mounted the engine on its mount on an engine stand with a dummy firewall so we could check cowling fit and design baffling before installing it in our airplane, to keep down-time to a minimum. We have the engine in our shop. It became obvious that we would have to make new cowlings, because the engine is longer, and the exhaust pipes and oil cooler air will exit differently. We preferred to do this anyway, so we could keep our Lycoming cowlings intact in case we wanted to reinstall the Lycoming.

It was a little difficult to design a simple induction system to supply the carburetor with filtered and alternate heated air, because the carburetor is located between the firewall and the oil sump, and there isn't much room to work with. We think we have that solved. We also ran into a problem on the prop hub extension, because the Franklin propeller flange has a smaller bolt circle than the Lycoming, and we didn't want to reduce the barrel diameter, but we think we have that problem solved as well. We still have to make the cowlings, and then take on the cooling baffling. It is our intention to leave the Lycoming installed in our airplane until we have completed as much installation work on the Franklin as possible, to keep down-time to a minimum. Since we will be on vacation in January, we probably won't make the change-over until February. If we don't think we will have time to fly off the restrictions before we have to leave for Sun 'n Fun, we could postpone the change-over until May. So far, the Franklin looks promising as an acceptable substitute for the 0-360 Lycoming. However, we still have a lot of work to do, not just installing it, but the all-important flight testing. We will keep you posted on our progress in the newsletter.

If there are others who are installing engines other than the 0-360 Lycoming, for the benefit of other builders we would like to report on your progress as well. If you send us your reports and pictures, we will publish them.

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## WEIGHT AND BALANCE

One question we are frequently asked is, what is the maximum front seat limit for the Cozy Mark IV? A quick but less than complete answer is that the nominal maximum front seat weight limit is 400 lbs. Actually, it is a function of the c.g., which in turn is related to how each builder builds and equips his airplane. It is also a judgment call as to what performance parameters are considered acceptable. The approved c.g. range for the Mark IV is F.S. (fuselage station) 97.5 to 102. One first determines the empty c.g. for the airplane, and then one can calculate what front seat loadings correspond to a c.g. of 97.5 and 102. The back seat and fuel tanks are located within the approved c.g. range, so they have only a minor affect on the front seat weight limits. Obviously, any extra weight installed in the nose, such as the battery or an electric nose lift would move the empty c.g. forward and would reduce the weight

limits in the front seat. On the other hand, a heavy engine installation, or heavy wings would move the empty c.g. aft and increase the weight limits in the front seat.

The Owner's Manual explains how to determine the empty c.g. by first confirming the fuselage stations of the canard, the wings, the seats, and the nose and main wheels, and then weighing the airplane. There are sample calculations to lead one through the process, and if the results differ much from these sample calculations, the builder should recheck his data and calculations. The minimum front seat weight, corresponding to a c.g. of 102, will most likely turn out to be greater than the weight of a single pilot. In my case, I weigh 160 lbs. (dressed for flying) and the minimum front seat weight is 220 lbs. Therefore, I have to put ballast in the front ballast compartment when flying solo (which is rare). The ballast compartment is 2-1/2 times as far forward of mid c.g. as the front seat, so 30 lbs. of lead in the ballast compartment is equivalent to 75 lbs. in the front seat, and  $160 + 75 = 235$  lbs., which puts me well within the c.g. range when flying solo. The heaviest passenger I have carried to date was 235 lbs., which put us at 395 lbs. in the front seat (in our flight tests with the moveable weight, we took off, flew, and landed with an equivalent front seat in excess of 400 lbs.).

Every aircraft, whether conventional or canard configuration, flies better at mid to aft c.g. This is the condition for least drag and lightest stick pressures. I like the way my Cozy flies at mid to aft e.g. much better than at forward c.g. We try to discourage people who are heavy and wish to carry heavy passengers from building a Cozy. We are not trying to discriminate against builders who are heavy. It is simply a matter that every design has its limitations, and if you try to design an airplane which will do everything, it will not do anything well. Our airplane was optimized for what used to be the average male and female weights, 170 lbs. and 120 lbs. respectively. Ben Owen, EAA Technical Advisor, advises prospective builders that only about 1 in 10 homebuilts are designed for really heavy people, and heavy builders should investigate very carefully before they make a decision of what aircraft to build.

We have no control over who buys our plans and decides to build a Cozy. As we travel to airshows and meet our builders, we have noticed that a few are quite heavy. When we ask them if they are aware of the limitations, they usually say that they are and are on diets and losing weight. We fear that they are aiming at the maximum weight limit of 400 lbs. (with passenger), and plan on operating routinely at forward c.g. We would prefer that they operate normally at mid rather than forward c.g. This was one of the deciding factors for us in evaluating the Franklin engine. It is 30 to 40 lbs. heavier than the O-360 Lycoming (we won't know what the final affect on c.g. is until we complete the installation).

A heavier engine installation would offset about the same additional weight in the front seat. We are doing this not so we can increase the nominal front seat weight limit of 400 lbs., but rather so that our heavier builders would have the option of operating at a more favorable c.g. It is true that the IO-360 with angle valves is also 30 lbs. heavier than the O-360, but we don't like this engine because it is only 4 cylinders and has harsher combustion strokes, putting more vibration on the airframe and more torsional stresses on the propeller and prop hub extension. The Franklin, on the other hand, is 6 cylinders and a very much smoother running engine, so it should be easier on the airframe and propeller.

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## PUBLICITY

Congratulations, guys! Two builders had Cozys featured in Sport Aviation:

1. Richard L Runyon, Cheney WA had a picture of his Cozy N5310L, together with some kind words (thank you Richard) published in October '95 Sport Aviation.
2. [Charles Wolcott](#), Simi Valley CA had picture of his Cozy Mark IV, also with kind words (thank you Charles) published in December '95 Sport Aviation. We saw it. It's Beautiful!

Nice work, guys! You get a renewal to your newsletters, our complements!

### [Publicity Addresses](#)

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## FIRST FLIGHTS

We have heard that Jay Rathbun completed a Cozy he took over from Dave Thalimer, and is flying, but we do not have a flight report for him as yet.

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## ACCIDENTS/INCIDENTS

The purpose in investigating and reporting accidents is to try to determine the cause; if there is something wrong with the design, to correct it, or if it was pilot error, to make suggestions as to how other builders might avoid a similar occurrence. We had an incident in September .

Remember in Greek mythology the story about Dacdalus and son Icarus? They escaped from Crete with large wings of feathers and wax. Icarus flew too close to the sun, the wax melted and he fell into the sea.

Our first builder to complete a COZY MARK IV in Orlando, FL, uses it for business and has accumulated more than 600 trouble-free flight hours. Returning from a business trip to Pensacola FL at night, he was taking a short-cut across the Gulf to his home in Orlando. At 10,000' over the Gulf, he heard the engine sound suddenly change, and his #4 CHT started to climb. He suspected that his #4 exhaust pipe had broken. His first landfall was Cross City, FL, about 1 hour away. He continued and landed at Cross City, removed the lower cowling and discovered that his #4 exhaust pipe had broken at the 2nd elbow and was lying in the bottom of his cowling. He re-attached it with high temperature tape and flew home to Orlando. The next morning he noticed that the incidence on both wings had changed; the left wing was 1/8" higher at the leading edge, and the right wing was 3/8" higher at the leading edge than before. The wings were secure in that position, and could not be wiggled.

After removing the wings, there was evidence of much heat damage. The Styrofoam behind the fiberglass rib at the wing butts had shrunk or melted about 3". The hot gases apparently also traveled along the centersection spar and around the end of the strakes, because the styrofoam behind the leading edge rib had also shrunk or melted. There was evidence of heat damage to the centersection shear web as well.

Our analysis, with which he agrees, is that the pressure in the cowling forced the hot (1450 deg. F)

exhaust gas to go along the centersection spar and out to the wing leading edge, heating all of the surfaces to above the heat distortion temperature of cured epoxy (softening it), and when he landed at Cross City with everything hot, the wings sagged and took a permanent set. We thank God that he did not have an engine fire and that his airplane was able to withstand 1 hour of cooking without experiencing a structural failure.

The spar caps in the centersection spar and wings were unaffected, but there was major heat damage to the centersection spar shear web, which he was able to repair. He also filled the voids where the styrofoam had shrunk away from the fiberglass wing ribs with pour foam. His Cozy is a little heavier now, but it is back flying.

We think it is worth mentioning that, living in Florida, he did not feel the need for a heat muff, so he did not install the shroud around the #4 and #2 pipes, which we think would have supported the #4 pipe and either prevented it from cracking or at least rotating and falling away if it did crack.

What can we learn from this?

1. Stainless steel exhaust pipes are not forever. They must withstand extreme temperatures and take tremendous abuse. They need to be inspected very carefully for cracks or signs of failure at every oil change or cowling removal.
2. We believe that the heat muff shroud around pipes #4 & #2, as shown in the plans, provides support for #4 (the longest one), that it reduces the stress on this pipe, and would hold it in place if it were to crack.
3. A change in engine sound and rise in CHT indicates an exhaust pipe failure, and requires immediate landing (unless you are over the Gulf). It would be wise to shut off the fuel supply as soon as you have the landing made.
4. Most builders overlook the fact that the high pressure air inside the cowling can escape by traveling along the centersection spar and out through the gap between the wing and the strake. This reduces cooling efficiency as well providing the opportunity for major structural damage if an exhaust pipe fails. This gap should be plugged. All centersection and wing fiberglass surfaces exposed inside the cowling should also be heat protected with 1/8" fiberfrax and aluminum.

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## REPRINTED FROM THE CANARD PUSHER

A VARIEZE crashed in Illinois recently, and unfortunately the pilot was killed. The passenger survived with severe burns.

After this Varieze landed on the 2300' paved runway, the two occupants complained that they smelled fuel fumes in the cockpit. They spent considerable effort trying to locate a fuel leak. No leak was found so they purchased fuel and took off.

At least 4 eyewitnesses saw the crash. The Varieze reportedly used nearly the entire 2300' runway



before breaking ground. It did not climb out of ground effect, and struck the corn in a field off the end of the runway before crashing a quarter of a mile from where they broke ground.

Witnesses reported that the engine sounded normal, and there was no sign of an in-flight fire. The Varieze was destroyed, and a fire broke out shortly after impact. The passenger was able to evacuate the aircraft, but received severe burns trying to get the pilot out.

This Varieze was known locally as a heavy aircraft, and routinely used lots of runway to take off. The pilot did not build this aircraft, but purchased it 3 years previously. He was a proficient pilot, and flew his Varieze often. The pilot was a large man, weighing between 270 and 280 pounds. The weather was clear with temperatures in the high 80's. The pilot's home base runway was 4,000' long.

**CONCLUSION:** This was a heavy example of a Varieze, and had a reputation for needing a long take-off roll. The day was hot and the pilot was a heavy man. With a load of fuel and a passenger, this aircraft was undoubtedly over gross. Even a lightweight Varieze (630 lbs.) would be at the maximum allowable gross weight just with this pilot (270 lbs.) and full fuel, not including a passenger! An over gross weight take-off from a 2,300' strip on a hot day is simply a recipe for disaster.

A LONG-EZ crashed on take-off in Arizona. The pilot was killed but the passenger survived with serious head injuries.

The aircraft was attempting to take off on a 7,000' runway with a 1 degree uphill grade. The Long-EZ was loaded to more than 150 lbs. over the maximum allowable gross weight. The temperature was 85 deg. F and density altitude was over 8,000'.

It was almost dark, 8:30 p.m. August 1995, and the tower operator reported that the aircraft initially lifted off at the 4,800' mark, but settled back onto the runway. The pilot continued the take-off attempt, lifting off briefly twice more before finally chopping the power and steering around the approach light system. Unfortunately, there was a 6' chain link fence around the airport perimeter. The Long EZ crashed into this fence, striking two fence posts, and breaking through the chain link. It crossed a road, broke through a wood-pole fence and came to rest upright on a golf course. There was no fire, but the chain link fence and/or the fence posts fatally injured the pilot and severely injured the passenger.

**CONCLUSION:** This was yet another example of an attempted take-off at over gross weight! Add to that, a hot, high density evening, plus an uphill runway! This pilot might have been successful with any one of these problems separately, but was unable to overcome them all.

A LONG-EZ crashed near an interstate highway in New Mexico. Weather at the time was bad with low ceilings, poor visibility in rain. The aircraft struck a tree (a very low tree) and was totally destroyed. Both occupants were killed. Several eyewitnesses reported seeing this aircraft flying very low near the highway. There was no evidence of any kind of mechanical problem, and it is believed that this accident was caused simply by the pilot attempting to fly VFR in IMC conditions.

**CONCLUSION:** This particular case is even more difficult to understand since this pilot was very experienced and IFR capable. Was this another case of get homeitis? Certainly, a 180 deg. turn before the weather degraded would have been prudent, and they both may have lived to fly home the next day.

In a tragic accident like this one, it is of course impossible to know what the pilot was thinking, or why

he continued in such poor conditions, but having done our share of scud-running, we have had to make many 180 deg. turns due to bad weather. So far, we have been lucky, and have made the correct choices. But it is not always easy and many things can cloud your judgment\_ having to be at work the next day; make a doctor's appointment; deal with a family emergency, etc., - please friends, know your and your aircraft's limitations, and fly within that envelope.

**EDITORS COMMENT:** The above accidents were preventable and unnecessary. The pilot-in-command is responsible to check the gross weight and to make a "go" or "no go" decision based on the aircraft's capability, the available runway, and the density altitude.

How can accidents such as this be prevented? Know your aircraft's limitations, and know your own limitations. Never try to operate outside of this envelope. Use your common sense. If you don't like the look of a situation, STOP and REEVALUATE what you are trying to do. Never allow yourself to be driven by schedule\_maybe better late in this world than early in the next!

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## OWNERS MANUAL MANDATORY CHANGE:

Do not fly until you add the following information to the Takeoff performance section of the Owners Manual, and comply:

### High Density Altitude Takeoffs:

The combination of high aircraft gross weight and high density altitude represent significant dangers for takeoff obstacle clearance. Special care is required to avoid premature rotation, i.e., if liftoff is too slow, the aircraft will be on the back side of the power curve and may not climb.

When operating heavy and high (say, within 100 lbs. of gross weight and above 5,000' density altitude) do not fully rotate to liftoff attitude until your airspeed is within 5 kts. of the best rate of climb speed, for your specific weight and altitude (see climb charts). This will require more runway than a slower liftoff, but will assure the best capability to clear obstacles and continue a safe climb. Never attempt takeoff under conditions in which you cannot achieve best rate of climb speed while still on the available runway. If this ability is not clear at any point during takeoff\_abort. Off-load weight or wait for a cooler time of day.

Lift-off is possible as slow as the minimum lift-off speed, and can be successfully used at light weights and/or low altitudes to achieve a short ground roll. However, that technique will usually result in inadequate initial climb if used when heavy or high.

Runway slope effects are minor when light or at low altitudes, but they become very significant when heavy/high. For example, a 1% uphill runway slope may add well over 1,000 feet to the distance required to clear an obstacle. Never take off uphill when your takeoff performance is marginal. Never continue a takeoff if crosswinds require you to brake so much that a safe liftoff is in doubt. Always use best power mixture for high altitude takeoff conditions. An over-gross weight takeoff that seems like an acceptable operation near sea level can be a real killer when hot and high. Never attempt a takeoff when over approved gross weight!

There may be considerable variance in takeoff capabilities from one homebuilt aircraft to another of the same type. Engine installed power and propeller efficiency at low speeds may be less than that for the prototype that provided the basis for the takeoff distance charts. Find a long runway and measure your takeoff capability at the weights you intend to fly. If your actual performance is less than the charts, correct the charts or improve your prop and/or engine. End of reprint from Canard Pusher

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## CAUTION - RETRACTABLE GEAR

On October 17th, the highlight on the TV news was a Cessna making a wheels-up landing at the Scottsdale airport. The pilot made repeated attempts to get the wheels down, without success. In the mean time, all of the news helicopters arrived to get the wheels-up landing on film. It was interesting to watch, but expensive for the owner!

Quite by coincidence, the next day, October 18th, we received a call from an Avemco Insurance Co. accident investigator, a Mr. Purks (phone number available on request). He was following up on the collapse of an Infinity retractable gear at St. Petersburg, FL on a canard aircraft during one of its first landings. He thought it was a Cozy, but we advised him that it was an Aerocanard (3/4 Cozy and 1/4 Velocity). We heard it was about a \$25,000 claim, because the builder damaged his airplane, had to tear down his engine, and wiped out an \$8,000 MT constant speed prop as well as some landing lights. Mr. Purks said that as a result of his investigation, he considers the Infinity gear to be an unsafe design, and expressed further concern about structural strength of the wings after cutting through the strakes to mount the Infinity gear on the centersection spar (we have discussed this subject before). He said that Avemco decided that it will not insure an airplane with an Infinity gear because it is too great a risk, and will not insure any other retractable gear until they have inspected and approved it. He seemed greatly relieved that we do not approve of any retractable gear on the Cozy. Nuff said!

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## CUSTOM SHOPS

At Copper State, a Long EZ builder told us about a very unfortunate experience he had with a custom shop in Bristol Wi. He paid in advance for a set of foam wing cores with the agreement that he could pick them up on his way home from Oshkosh. When he arrived at the shop, there was no one there. He waited 4-1/2 days outside the shop in a motor home he was renting for \$1,200/week before the owner showed up. He was told the cores were not ready yet, but they would work all night to cut them. The next morning the builder accepted the core bundle and did not un-bundle them until he got home. He found that the cores had been pieced and glued together from small pieces of foam, the internal wire and torque tube tunnels had not been cut and could not be cut because of the glue joints, and the airfoil on one wing had been cut upside down. He had to scrap the whole lot and was not able to get a refund on his money. The Long EZ builder asked us to warn our builders (again) because this shop is also advertising Cozy parts. We are warning you again, before sending money to any custom shop, please check their reputation with us. Unfortunately, when a builder is bilked, he is usually too embarrassed to tell other people.

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## CANARD AIRFOILS

When [Burt Rutan](#) designed the Varieze and later the Long EZ, there was almost no published data on low Reynolds number airfoils. One of the few airfoils which had been tested was the GU (for Glasgow University), which Burt selected for the canard, and we also used in the 3-place Cozy. It was later discovered that this airfoil had a mysterious characteristic, namely a pitch trim change in rain. RAF conducted experiments and determined that this amounted to a 2 deg. change in elevator position in cruise, and a 5 deg. change in slow flight. With 42 deg. of elevator travel available, they considered this to be no more than an annoyance. Further study showed that this pitch trim change could also occur at high humidities, presumably because there could be a minuscule amount of condensation on the surface, and could also be caused by bugs or dirt on or near the leading edge, waviness of the canard airfoil in excess of .005", and even a paint stripe on the leading edge. Even though this characteristic was not considered to be life threatening, builders were warned that moisture or other surface irregularities on the canard would extend their take-off distance. The pitch trim change phenomenon of the GU eventually became so overblown that Mike Melvill and [John Roncz](#) decided to evaluate other canard Airfoils on Mike's Long EZ. The 6th airfoil they evaluated performed almost as well as the GU, with the correct span it would not allow the main wing to stall, and it had no pitch trim change in rain! It became known as the Roncz canard and was offered as an option on the Long EZ (by RAF) and the Cozy-3 (by Vance Atkinson), and is standard on the Cozy Mark IV. We liked the GU so well on our 3-place, we never installed a Roncz.

Another option was offered to builders with the GU canard, if they were annoyed by its behavior in rain. That was to install a row of vortex generators on top of the canard, which prevent air flow separation. Builders who have installed these report that they still have all of the good characteristics of the GU airfoil, but no longer have a trim change in rain.

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## THE COZY MARK IV MAIN WING

We are occasionally asked whether Long EZ or 3-place Cozy wings can be used on the Mark IV, and we explain that they cannot. Although the Mark IV wings use the same airfoils (modified Eppler), and are dimensionally the same outboard of the strakes, there are some significant differences. First of all, the spar caps have been made 20% thicker, for added strength. We also eliminated the kink in the trailing edge, since this kink was not necessary to fit the cowling (it was on the Long EZ). We also extended the wing root inboard 4" for several reasons. The extra spacing between attach points obviously makes the wing attach system stronger. It also allows those of us with shorter arms to reach the inboard attach bolts more easily from inside the cockpit, and it also makes the cowlings a more reasonable size. We considered that the benefits of these changes far out-weighed any benefit of keeping the wings the same as on the Long EZ.

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## VACUUM BAGGING

Vacuum bagging uses atmospheric air pressure to squeeze excess epoxy from a wet fiberglass lay-up. It is widely used in production operations in the making of prefab parts, where it is necessary to squeeze

all of the layers of a sandwich structure into a female mold and hold them in place until they have cured. In moldless construction, vacuum bagging is not necessary, although it could save some weight. It requires extra material, extra equipment, and extra time. After a wet layup is in place and complete, a perforated plastic film is placed over the top, then an absorbent layer of material added, and then another airtight film is placed over the top, the edges taped down, and a vacuum is applied. Excess epoxy is squeezed through the perforated film and absorbed into the absorbent layer.

We do not recommend vacuum bagging in our moldless construction because of the extra cost, effort and skills required to achieve a marginal reduction in weight. We believe that the judicious use of peel ply can also compact a layup, remove excess epoxy and is almost as effective as vacuum bagging, but a lot less work and expense. Careful attention in contouring the foam and making good lay-ups is probably the most effective way of keeping weight down.

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## MARK IV CHANGES/CORRECTIONS

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### BUILDER HINTS

1. Alex Strong told us that one time he was taking a friend for a ride, his Cozy was very slow to accelerate to rotation speed. He realized later that he forgot to caution his passenger about not putting his feet on the rudder pedals, and his passengers feet were firmly planted on the pedals during the takeoff roll.
  2. Builder Bob Barree asked for a brief chronology for final assembly and finishing. We found that contouring (filling with micro) and maybe even priming exterior surfaces during airframe construction makes the final finishing much less burdensome. We also recommend painting the inside before installing the wiring and instruments, and before final painting the outside.
  3. Dennis Butler writes that a small drop of pour-foam in threaded holes or mounted nut plates that are about to be glassed over keeps the epoxy out of the holes and away from the threads. After cure, digging the pour-foam out of the holes is easy. We have been using candle wax, like from birthday candles.
  4. [Doug Ashby](#) says that rather than heat his entire shop in cold weather, he hung a string of infrared heat lamps (like they use in cafeterias) over his layup table and it works great!
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### FOR SALE

1. Cozy III, S/N 8, 50 TT airframe & engine (0-290). Terra nav/com with GS, King transponder & Mode C, elect. start. \$30,000. I lost my wife to lung cancer a year ago, so the goal to show her this beautiful country of ours is no longer in my future. Jim Krug, Dayton OH, (513) 434-3276.

2. Cozy Mark IV setting on the main gear and complete through Chapter 9 with canard cores from Featherlite and all the necessary hardware. \$4,800. I lost my medical. Craig Crandall, Pinedale, WY (307) 367-2623.
3. Cozy builder, [Bill Walsh](#), has arranged a source of tee shirts (sweatshirts available on request) which come in venous colors but only adult sizes. They have a detailed picture of the Cozy or Cozy MK IV. The Cozy name is printed above. Bill is also working on other Cozy items, such as jackets, caps, pins, and cups. The shirts are available at \$9.95 plus \$1.50 shipping and handling. Orders for 2 or more are sent 2-day priority. Make checks out to Linda Walsh, PO Box 160884, Altamonte Springs FL 32716. (407) 695-3543.
4. [Wayne Lanza](#) makes a number of very nice goodies for the 3 and 4-place Cozys. He has an electric speed break actuator kit with all the parts needed for installation, with instructions for \$275. His latest creation is a switching and breaker panel for the Mark IV. It is similar, but not identical to the one we had made for our plans model. It is located at the top of the panel, which is the best location for appearance and access to the electrical system. Wayne is using the highest quality DC switches (they are hard to locate) and circuit breakers, and pre-wires the panels, making the rest of the electric system installation very EZ. Cost is \$425. We really appreciate Wayne's contribution, and heartily recommend his products to you. Contact him at: 9425 Honeysuckle Dr., Sebastian, FL 32976 (407)664 9239.
5. We believe that the 4 pipe stainless steel exhaust system we designed and is being manufactured by Custom Aircraft Parts (see Authorized Suppliers) is far superior to anything else available or advertised for the 3 and 4 place Cozy (or Long EZ, or any other pusher, for that matter). Cost is \$500, which includes shipping and handling.
6. Rebuilt 0-360 Lycoming engines at a reasonable price. Contact: Dan Brown, (918) 834-0791.
7. New, improved fuel sight gauges. Clear bubble with white background. \$35 per set. Vance Atkinson, 3604 Willomet CT., Bedford, TX 67021-2431 (817) 354-8064.

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## WANTED

I am interested in purchasing a well-built Cozy III. Wayne S. Barksdale MD, 2020 Centenary Blvd., Shreveport LA 71104. (318) 221-1643.

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## LETTERS FROM BUILDERS

10/16/95

Dear Nat & Shirley,

Enclosed is a check for Cozy Mark IV plans. We really enjoyed meeting you this weekend at the Copperstate Fly-In. We learned a lot from you and other Cozy builders at the dinner on Friday and the

Cozy forum on Saturday.

There are several things that led us to choose the Cozy Mark IV over the other homebuilts. Some of the reasons, besides the airplane meeting our needs, were the designer support, the positive support of other builders, and the close-knit family that appears to be formed among the Cozy builders.

We would also like to thank you for taking Mike for a demo ride. The ride was the perfect inspiration for beginning our journey. We look forward to working with you and the other Cozy builders as we begin building our Cozy Mark IV.

Sincerely,

[Mike & Heather Anderson](#)

San Diego, CA

10/15/95

Dear Nat,

Just a brief note to let you know that Cozy N267CZ is flying well. Dec. 29, 1995 will be the 5-year anniversary of its first flight. It has 445 hours on it now.

It still gets a lot of attention at fly-ins and from corp. pilots who stop in at home base here at Burlington Airport. I am planning on Sun ~n Fun in '96. Hope to see you there.

Sincerely,

John Ashe

Durham NC

10/15/95

Hello Nat & Family,

I will not bore you with all the excuses for slow building - you've heard them all! The main one has been cold winter evenings. There is an inverse relationship between temp. and enthusiasm. However, some work has been done! Since these photos were taken I have completed the armrests, front and back. Soon I hope to fit the centersection spar. The turtle-deck is on for show only. All controls have been fitted except the throttle quadrant.

For some reason, mixed with the fact that winter sluggishness crept in, it seemed to take ages to finish the simple looking arm-rests and small parts. My suggestion to builders who are financially more fortunate than I, is that they purchase them prefab and they will finish quicker. For me, time is money, so I spend a lot of time.

I have been assisting my local EAA chapter builders by sharing freight costs on imported items. Every little bit helps. Some other Cozy builders are using this facility I've offered country-wide, so far by word of mouth. Please tell other builders. Airplane Plastics assured me they can ship more than one canopy in one box - at the same freight rate! Give me a call, S.A. builders.

Kind regards,

Rego Burger, S. Africa  
(041) 38-1757 H

10/6/95  
Dear Nat,

Due to some unfortunate person circumstances I have been unable to work on my Cozy for over a year. I am happy to report that I'm getting back on track and I hope to be able to resume before the end of the year. I have been able to follow your progress and I continue to be impressed with your talents and the aircraft you have designed. Keep up the good work.

I do have a question for you. Enclosed is a SSAE for your answer but you may want to say something in the newsletter for other builders who have suspended work for an extended period. My project appears to be in good condition. The project has been properly sheltered throughout this time. Is there anything that you can suggest that I check? I would appreciate your thoughts.

Sincerely  
Daniel R Schaefer  
Union, OH

***Editor** - Fiberglass layups and foam, for that matter, should last indefinitely if properly sheltered from sunlight. A light sanding over exposed surfaces should be all that is required to resume construction.*

9/27/95  
Dear Nat and Shirley,

I would like to say how excited I am to get started on my Mark IV. I've been researching the Cozy Mark IV for some time and I must say how impressed I am with the aircraft. After searching for the right aircraft to build, my choice became easier and easier. Your airplane has established a well-deserved good reputation in the kit/plans built industry as evidenced by the numerous well-favored opinions I received from other glass-built plane owners. Needless to say, I can't wait to get started. I will be on extended duty out of town from Oct. 9 until December. I would like to have received the plans prior to traveling so I can study them while away from home. Once again, I'm looking forward to a long and exciting relationship with you. Thank you for your help.

Alan W Wilson  
Edwards AFB, CA

9/26/95  
Dear Nat & Shirley,

I am embarrassed to admit that I suspended working on the Cozy for 8 months while building a new home. One benefit is that now I have a little more room to work. I made a change in the house plans, incorporating a removable wall between the basement and garage. The wall allows me to work in the basement regardless of the the temperature outside. You can probably picture the look on visitors faces when they see the Cozy in the basement and try to figure out how it is going to fit through one of those 32" doors!



Since resuming work, I have baffled the engine, primed the fuselage and continued with the wings. According to my construction log I have surpassed the 2000 hour mark. I have never regretted starting this airplane, but I am looking forward to finishing it so I can fly my "labor of love".

Sincerely,  
Mike Davis  
Elizabethtown, KY

10/9/95  
Dear Sir,

Enclosed is a check for renewing the newsletter. My Cozy is nearly complete, and I hope to take off early in '96. Thanks and kind regards.

Alexander Barjon  
France

10/10/95  
Dear Nat,

You may not remember me, but we met briefly at the Arlington Fly-in. It was great to have a chance to see the actual aircraft and take a lot of pictures, and to meet others who are further into the project than am I. It's taking me a while to get our basement garage turned into a shop, as our house was built in 1908 and certainly not with the idea of an airplane taking shape within its walls. However, I know I will persevere. The newsletters are great inspiration. Thanks!

Sincerely,

Kevin Henderson  
Seattle, WA

10/10/95  
Dear Nat,10/10/95

I've been working on the Mark IV for almost eleven months now and have put about 850 hours into the project. Things are going very well. I'm working on the canopy frame. The wings/winglets have been completed and mated to the center spar that is now installed in the fuselage. I am trying to fill the weave with a preliminary layer of fill as I go to make finishing the MKIV easier. The controls have been installed and I am looking forward to working on the strakes and installing the engine/avionics. Thanks for your support and a great set of plans.

Sincerely,  
Brad W. Crawford  
Melbourne, FL 10/11/95  
Dear Nat,

Could you please send me copies of building manual pages 5-4 and 9-4. I left the plans on the living

room floor after a long night of reviewing them, and later that evening our family dog decided to make a few alterations. The plans have now been copied and each page encased in a plastic cover.

I have now built two complete Cozy IVs in my head and will have the garage turned into a workshop by January. I have been spending most of my time (and money) taking flight lessons. Yes, I purchased the plans before I had ever flown. The Cozy was my motivation!

The past weekend I met with the southern CA Cozy support group in Porterville. Got to fly a Cozy III - loved it - can't wait to ditch the 152 trainer and do some real flying.

Hopefully, the next time you receive a letter from me, I will have a fiberglass boat in my garage looking for wings.

Sincerely,  
[John Van Doren](#)  
Fresno, CA

11/10/95  
Dear Nat & Shirley,

I wish to renew my newsletter and take a few lines to tell you how Cozy MK IV #374 is coming along. This is just past my one year anniversary of building and I am somewhere in the middle of Chapter 7. The bottom is contoured, nav antenna installed and landing gear door nearly completed. I am preparing to glass the fuselage exterior.

So far all has been going well and I am becoming much more confident about my building abilities. I really enjoy seeing the "big changes" in my airplane as the construction progresses. My whole family (all 6 of us) are excited about the project but I think my two year old son, Lucas, is the most enthusiastic. He watches me at work and when I turn away from him for just a moment I catch him with a piece of sandpaper trying to sand on the plane like his dad. We have contemplated a name for our finished airplane. The one I like is "Luke's Sky Walker".

Sincerely,  
Leroy Bloxsom  
Antioch, CA

10/20/95  
Dear Nat & Shirley,

Our 34PC has over 700 hours on it and doesn't show the slightest hint of change, deterioration, movement, cracking, etc. Wouldn't go back to the 310 Cessna for anything.

Thank you  
Marv Schuh  
Elk Grove, CA

11/25/95

Dear Nat & Shirley,

This is our Christmas greetings letter.

One major event to report this year. Bob retired last January and is having a very successful year working on the plane. He took early retirement purely to work on the plane. It is now sitting on its wheels.

Unfortunately, I broke my arm so haven't been of much use, but lately Bob's sister has stepped in and is currently helping him cut cores for the wings with the hot wire saw. They have some fun, I believe! I have been the photographer and am enclosing a couple of shots. The aim now is to have the wings finalized by Christmas!

Bob has taken to rising early and starting work in the shed at 9 am. Then he seems to work through (except for coffee, tea and sandwich breaks) until 9 pm. Certainly its getting the work done.

Hope all's well with you both and good to hear of your travellings in the newsletters. We can't wait to do the same.

Happy Christmas and successful 1996.

Sincerely  
Angela & Bob Allen  
W. Sussex, England

11/25/95

Dear Nat and Shirley,

Enclosed is a picture taken at the Cozy Banquet during Copper State.

We had a real nice trip from Mesa (after Copper State) to Sweetwater, TX; refueled and then on to Minden, LA, where we spent the night. The next day, we flew to Auburn AL (U of AL Flying School) for fuel. We had a group of students around our Cozy asking all sorts of questions and where they could get information on building one. Of course Norma (salesperson that she is) gave them your phone number and address. Then on to Beaufort SC where our daughter and her husband are stationed. He arranged for me to take a flight in an F/A-18 simulator. It was quite an experience. I have the certificate to prove it.

We spent 3 days there, took in the WW II museum, watched the rehearsal of the graduating Marines at Perris island, and had a 3-course seafood dinner that night. Then we took off for Crisfield MD where Norma's family are. This was the first time people there saw a Cozy. As soon as we landed, here comes this guy with a fishing pole and said, "I saw you come in and rowed as fast as I could to shore and came here, just to see this airplane". The airport manager insisted we keep the Cozy in his hangar in case of rain. The whole family came, took pictures and Al took my sister in law for a ride which she thoroughly enjoyed. She had never been in a small plane before.

After 3 days, we left for home, refueling in Accomack VA. The airport was attended by a little lady and

her dog. She says, "What kind of an airplane is that?" Of course we told her and where she could buy plans. Weather caught up with us in Philadelphia MS. Although it was still early, we knew it was going to rain so we stayed the night. The man at the airport suggested we call the Casino to pick us up and take us back in the morning. We were surprised to see a Casino in the middle of a small town, but there it was. After a late start the next morning, we flew 500 miles to Sweetwater. We stayed the night, left early the next day, refueled at Coolidge AZ, and arrived home around 3 pm.

The Cozy performed magnificently. Although we were ready for rainy weather, we didn't see any. We have since gone to Death Valley and found out why not so many fly there. They have no fuel available. Alex is going to fly to Apple Valley tomorrow to pick up a set of valve cover gaskets, although we are not having any problems. He thinks the gaskets should be replaced. I think he just needed an excuse to fly somewhere, and why not. The Cozy is so easy to fly and saves so much time that it is fun to go anywhere. We are planning another trip soon, probably to Florida in the summer. We shall see.

Regards,  
Norma & Alex Strong  
Yermo, CA

12/1/95  
Dear Nat,

Two years ago this month I bought my MK IV plans. Because we were entering into the winter months in northern Wisconsin, I was looking forward to a productive 4 or 5 months of full time work on my new project.

In January I received a call from a good friend in San Antonio asking if I would come down for a few weeks to help him build his new home.

The next thing I knew I was packing up the wife and kids and moving to San Antonio. I guess that warm San Antonio air was all it took. We sold the farm in Wisconsin and drove in stakes in San Antonio.

After living there for a few months I took an unexpected helicopter ride to the hospital after a work related accident. Unfortunately, this accident plus the move put the Mark IV way down on the priority list.

Well now that the dust has settled and I have fully recovered from my injuries, and a new home with a large garage to work in, I am ready to get back to work on my project.

Sincerely,  
Dwight Johnson  
San Antonio, TX

12/4/95  
Hello,

This is the first letter I have written to you since purchasing plans ~#418. My wife, Karen, and I are both helicopter pilots with little to no fixed wing time. Until we saw one of your Cozys on the cover of

Sport Aviation, we had no urge to fly fixed-wing aircraft. Now we are planning where we will go once the aircraft is completed.

I have an A&P & IA background, so I've read every piece of information on your Cozy I could get my hands on. Karen is tired of this information being all over the house.

We moved from Southern California to Hawaii last July to a new job. During the move, our son Timothy (6 months) enjoyed the flight, I was so happy, Karen was relieved and the other passengers didn't have to drink as much.

We are recovering from the move, our child and the new job. I am starting to gear up to start the Cozy project. Is there any place out here to purchase Materials? Anything has to be better than paying freight on everything. I have even thought of starting a supply store for homebuilts, mainly composite aircraft, it was just a thought.

Sincerely,  
Darcy D Reed  
Kaneohe, HI

11/18/95

Dear Nat and Shirley,

You probably don't remember, but my wife Alexandra and I did meet both you and Shirley in Oshkosh '86. Back then, as I recall, you were fresh out of the info packs for the 3-place Cozy, and my impression was that you seemed skeptical of the interest a couple of college kids, on a shoe-string budget, may have had in the Cozy. Anyhow, jump forward almost a decade and the two college kids, albeit somewhat older, are settled in southern California, living the American dream the best they can with the ups-and-downs of the aerospace industry, while raising a family (daughter Vivian, 21 months old) and are now planning to build a Cozy Mark IV.

Well, not so quickly. The first order of business is the construction of a garage, ah, I mean workshop in which to build the Cozy. The task has proven quite an undertaking in itself, given the tight regulations and exorbitant costs out here. But the plans are nearly drawn and we expect to have a completed 2.5 car garage soon after the rainy season ends in March. From that point on I suspect we'll make slow progress given our family and my work obligations. I think Oshkosh 2003 would be an appropriate completion date, don't you?

While pushing the garage project along, I've been reading and looking over the plans. My first reaction after paging through both sections was sheer doubt. I thought ... even if I could do all this, it would take me 2 life times to finish. Look at all this detail! After planting that thought in the back of my mind and living with it for a couple of weeks, I started carefully reading the plans. When I got through the tutorial chapter and into the fuselage construction, the self-doubt gave way to a feeling of moderate confidence. After all, I thought, with the amount of explanation and detail that you provide in the plans, the newsletter, and the direct support, it's only a matter of persevering at the task long enough to see it to completion. Soon after, I began updating the plans in accordance with the published corrections. I still have about 10 newsletters to incorporate and index, but I'm thrilled to be starting a project I've been wanting to do all these years. Now if I could only get the rainy season out of the way and get that darned garage put up... As for renewing my newsletter, I must echo the sentiments of so many others who have



written in to say that it is an excellent source of additional information and inspiration, and that I look forward to reading each new issue. Thank you for your continued support. Happy Holidays!

Bernie Morgowicz  
Manhattan Beach, CA

12/2/95  
Hi Nat,

Here are some pictures of MK-188. As you can see, it is done. It has been a long way, but if I had to do it all over again, I would!

Waiting on the paper work and doing some final touch-up here and there.

A piece of advice to all of you builders: Treat your foam like a finished product. It can save you a lot of backache and sore arms, when it comes to the finishing.

She looks good now, after many hours of filling and sanding. I will keep you posted about the first flight which should occur sometime in January - God willing!

Best regards,  
Val Oliveira  
So. Floral Park, NY

11/22/95  
Dear Nat,

Happy Thanksgiving to you and Shirley! Work on the Cozy continues despite irritating interruptions (i. e. work) and I continue to enjoy the process. Almost finished the canard last weekend but, as luck would have it, the temperature dropped below an acceptable level for a layup session. The day wasn't a total loss, however, as I had an opportunity for some back seat time in Skip Barchfeld's Long EZ. The flight was great as Skip proceeded to teach me some of the finer points of take off, landing and overall EZ flying skills. It had been some time since I had last flown and it surprised me to find that I could still manage the stick fairly well.

As I mentioned on the phone, the epoxy reaction problems now seem controllable by my limiting exposure time, being meticulously sanitary while working and a thorough cleanup process that includes waterless, vinegar and finally regular soap and water. All this on top of using gloves as well as barrier cream. This may sound excessive to some but I now have virtually no problems. I wouldn't change anything as long as progress continues successfully. By far the most significant improvement has been from the use of double gloves. The outer layer is cheap latex which I now believe is better than vinyl for toughness and on resistance. The real find, however, was the inner glove made of nitrile by Best Manufacturing, style #7005L. I found them locally at Safety Supply. These are the disposable type of nitrile, about ~\$15/box of 100. Not inexpensive, but I get a lot of mileage out of a pair by changing the latex as frequently as necessary to maintain cleanliness. They are also very tough and, well, fit like a glove. I'm enclosing a pair so you can see what I mean.

This month I hosted a "tire kicking" session, sort of a show and tell event that displays a certain aircraft project. We had a good turnout and a great time discussing composite construction. More than a few people were envious of the plans set I displayed, especially the people who had been through the Varieze and Quickie/Dragonfly series.

My builder buddies continue to provide much appreciated assistance for the larger layups. Our little group continues to grow as people seem eager to "get sticky", and, surprising to me, they are even more enthusiastic after the first messy session to do it all over again. Must be something in the epoxy to create this euphoria - of course, most of them are active builders or soon to be themselves and the layup sessions serve as good practice for their own projects. It is my good fortune to live in an area where such enthusiasm exists and I'm grateful for their help.

I also want to express my sincere appreciation to you for the concern and support you have given me, especially these last months since Oshkosh. Our discussions have only made me more determined than ever to find a way to see this project through to completion. It would seem that now we are back on track. Also, thanks again for sending [Gordon Bowen](#)'s "Special Brew" to test. It wets out well, the best yet, and rest assured that I'll put it to good use.

Best regards,  
[Greg Smith](#)  
San Antonio, TX

***Editor** - Greg had the most severe allergic reaction I have ever seen and was on the verge of selling his project. We worked with him and now he seems to have the problem under control.*

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[\[Prev\]](#)[\[Next\]](#)

[\[Newsletters\]](#)  
[\[Cozy MKIV Information\]](#)