

## COZY NEWSLETTER #88 Jan. 2005

Published quarterly (Jan., April, July, Oct.) by:

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**Subscription rate: \$16.00/2 yrs. \$20.00/2 yrs. OUS**

It is time again to wish you all:

# Merry Christmas & Happy New Year!

As of January 1, 2004 Aircraft Spruce purchased the intellectual property (copyrighted plans, Construction Manuals, Owner's Manuals, information kits, etc.) of Co-Z Development and since that date, Aircraft Spruce is the only one authorized to sell Cozy plans and Construction Manuals, info kits, etc., but Co-Z Development will continue to provide builder support for the Cozy airplanes.

The 3<sup>rd</sup> Edition Cozy Mark IV plans were updated with all changes and corrections through newsletter #73. Since then, there have been no changes or corrections of any significance, except for revised canard incidence template drawings 80-3 and 80-4. These revised drawings will be included with each new set of plans, and extra copies may be obtained from Aircraft Spruce by sending them a stamped, addressed envelope.

The Cozy newsletter will continue to be published by Co-Z Development. It contains any plans corrections or changes, builder hints, information and updates about our suppliers, shopping info, first flight reports, and other news of interest to builders. It is the principle means by which we communicate with builders and support their projects.

The latest copy of the newsletter and older copies of the newsletter, which we can no longer supply, are available on the Unofficial Cozy Web Page, <http://www.cozybuilders.org/> and also on a CD available at Aircraft Spruce. We will continue to answer telephone calls whenever we are home and personal letters as well, but please enclose a stamped, self-addressed envelope if you expect a reply. We encourage newsletter input from builders (letters and pictures) which would be of interest to other builders.

"Cozy" and "Cozy Mark IV" are trade names of Co-Z Development and are the names given to airplanes built according to the plans and instructions of Co-Z Development. Just because you buy a set of Cozy or Cozy Mark IV plans, does not mean you have to build your airplane exactly according to plans. It is an experimental airplane and you can, in fact, make whatever changes you desire. But then you have a new, untested design, and shouldn't register or insure your airplane as a Cozy or a Cozy Mark IV.

## AUTHORIZED SUPPLIERS

Authorized suppliers are those suppliers we selected because of their excellent reputation in the industry, whose parts and materials we proofed in our plans model and who agreed to supply the same parts and materials to our builders.

### **1) Basic Materials**

Aircraft Spruce West	Aircraft Spruce East	Wicks Aircraft
Box 4000	452 Dividend Dr.	410 Pine St.
Corona, CA 92880	Peachtree City GA 30269	Highland IL 62249
(909)372-9555	(770)487-2310	(800)221-9425

### **2) Metal Parts**

Brock Mfg. Co.  
11852 Western Ave.  
Stanton CA 90680  
(714)898-4366

### **3) Fiberglass Parts**

Feather Lite  
1327 S State St., Arpt.  
Ukiah, CA 95482  
(707)462-2939  
(707)462-3424

### **4) Canopy & Windows 5) Specialties 6) Exhaust Systems**

Airplane Plastics Co.	B & C Spec.	Custom Aircraft
9785 Julie Court	PO Box B	14374 Olde Hwy 80
Tipp City, OH 45371	Newton KS67114	El Cajon CA 92021
(937) 669-2677	(316)283-8662	(800)561-1901

### **7) Propellers**

Performance Props	Sensenich Props	Saber Mfg.
Box 486	2008 Wood Ct.	3601 Nassau Ct.
Patagonia AZ 85624	Plant City FL33567	Granbury TX 76049
(520)394-2059	(813)752-3711	(817) 326-6293

### **8) Prop Hub Exten.**

## OTHER PARTS WE RECOMMEND:

We can recommend the following items:

- 1) New and rebuilt Lycoming engines.** Aerosport Power, 2965 Airport Drive, Kamloops, B.C. V2B 7W6 Tel (250) 376-2955, Fax (250) 376-1995.
- 2) Luggage pods.** Gary Hunter (Epoxy expert) writes. I have been providing baggage pods for Variezes and Long Ezs for a number of years now. A few people have ordered them for the COZY. The standard pod is 6.5 ft. long and 12" dia at the fattest section. I am currently working on a slightly larger pod that will look proportionally better on the COZY. They aren't much longer, but they are 1.5" larger in diameter along their entire length. That doesn't sound like much, but they are noticeably larger. They will hold a lot more duffel style baggage. Larger items, like golf bags, will fit much more easily. Incidentally, for CG consideration, the tail section of the pod (24") is not used for carrying luggage. But long, light items, like snow skis, can be carried in the tail section. The pods have a fairly flat bottom, so skis can ride on the bottom, and baggage sits on top of them in the front section. I anticipate completion of the molds in a month or two. Gary [gluegaru@earthlink.net](mailto:gluegaru@earthlink.net).
- 3) New TMX Engines.** Teledyne Mattituck Services, 410 Airway Drive, PO Box 1432, Mattituck, NY 11952, (800)624-6680.
- 4) Improved Rudder pedals** for lay-down brake cylinders, adjustable both sides. Dennis Oelmann (319) 277-5996.
- 5) Electric speed brake actuator kit.** Wayne Lanza (772) 664-8953; [wlanza@bellsouth.net](mailto:wlanza@bellsouth.net)
- 6) Switching and breaker panel.** Wayne Lanza (772) 664-8953, [www.CompositeDesignInc.com](http://www.CompositeDesignInc.com).

- 7) **Fuel sight gages.** Vance Atkinson (817) 354-8064.
- 8) **Electric nose-lift.** Steve Wright (615) 373-8764.
- 9) **Electric nose-lift, Spring steel safety catch,** and improved **MKNG-6 and NG-6 Pivots** with tapered roller bearings. Jack Wilhelmson (843) 884-5061.
- 10) **Electric pitch trim.** Alex Strong (760) 254-3692.
- 11) **Rebuilt flight instruments.** Howard Francis (not a Cozy builder) (480) 820-0405.
- 12) **Antennas.** RST Jim Weir (530) 272-2203.
- 13) **Teflon & Stainless Hinge Pins Replacement.** Gary Hall (954)979-9494.
- 14) **Nosegear crank ratchets.** Bill Theeringer (805) 964-5453.
- 15) **Featherlite:** Their email address is: [fhrlite@pacific.net](mailto:fhrlite@pacific.net)  
Check there for latest prices.

## PLANS CHANGES/CORRECTIONS

Nat and others, 7/09/04

I just found mistake in the Chapter 24 materials list. This is with the 2<sup>nd</sup> edition plans – don't know about the others. The plans call for 12" of hinge and 14 rivets. For the rear seats you need eight 3" lengths of hinge with 6 rivets each. That's 24" of hinge total and 48 rivets. Plus, you really need more hinge since you need each piece of hinge to have extra hinge pin for removal so I would suggest at least 32" of hinge (an extra inch per piece).

Rick Maddy  
Denver, CO

## BUILDER HINTS

- 1) **Extra M drawings.** Some builders have asked if they could buy additional copies of the M-drawings, to replace those they have cut up. Cozy builder Kenneth Knevel, an architect by profession, has arranged to supply Aircraft Spruce with extra copies. The neat thing is that he has joined the drawings together so that the bulkheads, jigs, templates and fuselage cross-sections are in one piece and no longer need to be pieced together. Order P/N 01-00570 from AS for \$49.95.
- 2) **Teflon coated wire:** Nick Ugolini says you can buy all kinds of shielded and unshielded Teflon coated wire (MIL spec) from <http://www.skycraftsurplus.com>, and that the prices are super good, too.
- 3) **MGS cost:** Dan Tomlinson reminds everyone that MGS is priced based on 1 gallon of resin and .45 gallon of hardner, resulting in almost 1.5 gallons of epoxy. He says it wets out so well that it goes farther than Aeropoxy, making the effective cost about the same.
- 4) **Epoxy allergy:** Larry Capps says that the epoxy hardner causes many of the allergies you expect from epoxy. He says you can neutralize it by rinsing-off with "white vinegar", which changes the chemical structure to a water-soluble compound. Then you can cleanse you skin by washing off with soap and water. He reminds us that two prime sources for allergies come from the powder found in some gloves, and in latex gloves themselves.
- 5) **Nitrile gloves.** Rob.... Says he switched to nitrile (from butyl) gloves, and hasn't had any allergies since. Joe...says he got his nitrile gloves from his dentist for free. The dentist made him promise not to use latex, and only use the very heavy butyl sparingly. He says he saw a demo in CA where the solvents in epoxy hardner breached latex in 45 seconds,

and then became measureable in human blood (5 ppm) after 60 seconds.

## FOR SALE

1) Dennis Oelmann (a master builder) writes: 11/15/04  
I have a set of wings match drilled to a main spar and a Roncz canard for sale. The wings have the ailerons and rudders cut out and mounted. The canard has the elevators mounted and tips on. All parts are per plans. If anyone is interested in these parts to further their project, please email me privately for details. Thanks. Dennis. [FLYCOZY@AOL.COM](mailto:FLYCOZY@AOL.COM). (319)231-2635

2) Michael Link writes: 9/28/04  
A number of factors have come together that cause me to do what I never imagined I would do.....SELL MY COZY MK-IV. I have enjoyed flying this remarkable design, but it is time to move on. I plan to leave aviation altogether; after the Cozy, just about anything else would be anticlimactic.

The plane is a well-equipped VFR aircraft, easily convertible to IFR. I was very careful in building her and consider my workmanship to be above average. I plan 185 kts for trips....turning about 2500 rpm at full throttle. She climbs at 1700 to 2000 fpm with me and 30 to 40 gal of fuel. Handling is great, as one would expect from any well built Cozy. The interior is attractive and comfortable. If you want a Cozy you can have one for not much more than the current parts cost. For pictures go to [www.geocities.com/mglink162/MyCozy.html](http://www.geocities.com/mglink162/MyCozy.html). My phone numbers are posted at the above link if you wish to call me.

Michael Link  
Hermitage TN

## CIRCUIT BREAKERS vs. FUSES

There was much discussion on the internet of circuit breakers vs fuses. The opinions seemed evenly divided. Distilling all this discussion, Kevin writes:

Builders, 11/18/04  
I have to add my 2 cents. This is my first time to post after reading thousands of posts. I have had experience in flying where an electrical problem caused a breaker or 2 to pop. It was night and all the lights went out. I was at a controlled field and was just turning downwind on my last landing for night currency. There was traffic in the pattern and my radio went dead. I reached down and started pushing in breakers and everything came back on. I landed without incident (except for the need for a clean pair of shorts). Taxiing back to the hangar, and flipping landing light switches (right, left, 1961 Commanche) yielded another breaker pop. One bad starter (drained the battery on start-up; not a problem during the day. Lights kept the battery from charging after assault by the starter. Old, sticky gear motor drew too many amps and caused the ALT field breaker to blow, which left the almost dead battery to carry the load with radios and nav lights still draining it. There is NO WAY I would have been able to operate that aircraft at that time in a safe manner (by myself) using fuses. If you only use your aircraft during the day, you could probably get away with it. But at night, when you're blind without lights, and you need your eyes to be somewhere else (on the defensive, now, without lights, no one can see YOU!) a little raised bump of a circuit breaker button feels pretty good.

In the robotic industry, of which I am a small part, there are fuse holders which emit a light when the fuse is blown. These are used primarily where slo-blow fuses are used (These can take a shot of up to 25 percent or more above their rated amperage tolerance for

short periods of time to enable motor speed up, system initialization, etc.) whenever it is expedient to display such a fault, it consists of a diode and an LED. This would help you to find blown fuses in the dark, but it wouldn't help you to change them.

In the above mentioned experience I couldn't find my flashlight in the seat next to me, until the lights came on. There it was, nestled between my kneeboard and the back of the seat where I couldn't feel it.

I don't see what the big deal is anyway. Fuses work fine. So do breakers. Mark me down for breakers. Kevin

Cozy #618

## ELEVATOR TRAVEL

Occasionally I am asked if it is necessary to have 15 degrees trailing edge up travel of the elevators. I have answered that there are two situations where you need all the nose down authority you can muster:

- 1) Engine failure during climb shortly after takeoff, and
- 2) Incipient main wing stall (extremely unlikely) during stall testing at aft c.g.

In the latter case, I have advised that if the bottom ever seems to fall out during stall testing, accompanied by a sudden drop in airspeed, ram the stick forward as quickly as you can and you will fly out of a main wing stall.

Kent Ashton writes:

11/15/04

I thought I should test my new Cozy IV at the aft c.g. limit so I loaded it accordingly and did an aggressive full aft-stick stall, holding the airplane with the stick full aft. The airplane showed the expected fairly strong pitch-buck with the stick held full back. It would be impossible to miss the strong pitch-buck in one-g flight. On maybe the second or third pitch-buck, the nose pitched up and the bottom seemed to fall out. I immediately went full forward on the stick and full power, and it immediately recovered. I initiated recovery in less than a second and the aircraft pitched over immediately. A person would have to be pretty ham-fisted to get to that point accidentally. I probably didn't need to "test" that thoroughly. I think the only way you could get to that point inadvertently is by falling out of a loop or doing accelerated stalls, solo, without ballast.

I'm sure it was an incipient wing-stall, but (1) the airplane gives more than adequate warning in the usual 1-g flight regime, and (2) my airplane could be misrigged or improperly constructed, or (3) I could have miscalculated and loaded the airplane aft of the published aft c.g. limit, but I don't think so.

I am careful with ballast and "BALLAST" is on my "Before Takeoff" checklist. If you ballast the airplane properly and don't fly it stupidly, I don't think it will ever bit you. I'm very pleased with mine. Kent Ashton

## ELEVATOR POSITION

When Vance Atkinson evaluated the Roncz canard on his Cozy III, he obtained and plotted data on elevator position vs speed at 3 different c.g.s, similar to what I did for the Mark IV. He writes:

10/22/04

"Nat, here are the plots of the Roncz canard of elevator position vs airspeed on my Cozy III, done in 3 different c.g.s. Notice on the aft c.g. (where I fly most of the time) how the elevators are "up", dumping lift. Particularly above 125 kts indicated. You can publish these or send them to anyone you like. Vance"

These are published on the next page, and are similar to what was published for the Mark IV in newsletter #56-5, except that I drew a smooth curve through the data points. Note that the y-axis is degrees of trailing edge DOWN. Compare your elevator position with this plot (and 56-5) before expanding your flight tests to aft c.g., and if you use more trailing edge down than the plot shows, increase the angle of incidence for your canard.

## MORE ON ELEVATOR/RUDDER FLUTTER

Wayne Hicks made a survey of flutter incidents.

He writes:

11/01/04

The flutter incident at Rough River a few years ago is well documented in a CSA newsletter. A Varieze was doing a low pass at high speed. At about the time you would expect the pilot to apply back pressure to start a climb (abeam of the taxiway), the aircraft shook violently and made a sound like a Gatlin gun. The sound lasted almost a full second. The canard was flapping up and down so rapidly that it appeared as a blur to those on the ground. The aircraft made a normal landing with the pilot a bit shaken. Others helped him remove the canard. The elevators were found to be way out of balance (trailing edge heavy). Additional counter weights were added and he flew home very slowly.

One of the attendees had a high-speed video camera and just so happened to be filming the pass. The incident was captured on tape. The group at the lodge reviewed the video frame by frame. Watching not only the canard, but the winglets and wings shake as a result of the disturbance was eerie.

About 5 builders offered up stories of rudder/winglet flutter. Four were attributed to the rudder being inboard of the centerline. One of the four included a winglet/rudder that wasn't shaped/contoured correctly in addition to being inboard of the centerline. One was due to a weak rudder return spring.

A pilot of a Cozy III with about 1600 hours reported that about ten years ago, he had multiple episodes of "flutter" that occurred at a very specific airspeed, about 121 knots. During these episodes the canard would indeed oscillate at the ends up to one foot accompanied by violent shaking. The pilot discovered that it would stop with an increase or decrease in speed, or pressure on the left rudder. Eventually he found that the rudder stop on the left, which was made of wood, had worn causing the rudder to move inward. Replacing and shimming the rudder outward solved the problem for the last 1000 hours or so.

All the reports mentioned that if flutter occurs anywhere on the airframe, the whole plane will shake.

## EMPTY WEIGHT

The Owners Manual gives 1050 lbs as the empty weight of the plans model (Serial #0001) Cozy Mark IV. This was the dry (no oil or fuel) weight weighed on electronic scales before its first flight. It did not have wheel pants or a spinner. Since then, the canard was shortened, lower winglets, wheel pants, spinner, electric nose lift, electric pitch trim and way too much upholstery were added, which resulted in an estimated empty weight of approximately 1110 lbs. After installing the heavier, 6 cylinder Franklin, with a heavier bed-type mount, and extra remote oil cooler, a remote oil filter, heavier exhaust pipes, a heavier induction system, and a heavier cowling, the dry empty weight was 1194 lbs. The Franklin was subsequently removed and the Lycoming reinstalled. The extra weight of the Franklin was one of the reasons. Our recommendation is to forego

fancy upholstery, paint the inside with Zolatone, and just use simple seat cushions, use the lighter Wilhelmson nose lift, and keep the airplane as light as possible, because light airplanes perform better.

Carl P Lindon writes, 11/15/04

Could any builders with flying Cozys let me know your actual empty weight. The Official site lists the “dry” weight as 1050 lbs, but informal discussions/private e-mails with a number of people indicate that few if any Cozys actually come in at that weight I’ve heard anything from 1125 to 1300 lbs. Both numbers seem pretty extreme – minimally upholstered ships with basic instrumentation should be close to the spec number and even richly appointed ships with all the bells and whistles should come in as less than 1300, shouldn’t they? Actual numbers please, the “fleet” actual average, mean and deviations would be of great interest.

Lloyd A Gimple writes: 11/16/04

My Cozy Mark IV weighs 1186 lbs. This includes electric nose lift, electric speed brake, 200 hp IO 369 C1C Lycoming, Apollo GPS/Com, upholstered conforfoam seats front and rear, 8 qts of oil, but minus wheel pants and spinner.

Doug Pitzer writes: 11/16/04

My Cozy MKIV N433DP with a 180 hp IO-360, electric nose lift, one battery weighs 1185 lbs.

Mark Beduhn writes: 11/15/04

My Cozy Mark IV N494CZ with electric nose lift, 180 hp IO-360, and one battery weighs 1189 lbs.

John Epplin writes: 11/15/04

My Cozy Mark IV N100EP, with IFR capable instrumentation, including PN-101 HIS with electric DG, 2 nav/com systems plus IFR certified GPS, temperfoam front seat cushions, electric nose lift, electric speed brake, electric trim, dual batteries, Aerosport power 0-360 A1A engine and 3-blade Catto prop weighs 1215 lbs. I fly frequently with 425 lbs in the front seat and full fuel. Nose comes off about 70 kts.

John Slade writes: 11/15/04

My empty weight was 1210. That includes a turbo Mazda, airconditioning, seats and headrests, upholstery, a cooling fan, walnut paneling, extra landing light and miscellaneous extras totalling 161 lbs.

Al Wick writes: 11/15/04

My Cozy IV N9032U, 200+ hours on engine/airframe, is powered by a stock Subaru 2.5 My original empty weight came in at 1145 lbs. I’ve gained a few lbs since....so has my plane. It is now up to 1160 lbs. Not too bad. I typically fly with 430 lbs. front seat weight. Definitely not a problem. The published empty weight is about the only item which is not realistic. All the other stuff like build time were right on the money. I had my plane doen in 2000 hours, except for paint and instruments.

Marc J. Zeitlin writes: 11/15/04

When I did my original weight and balance 2.5 years ago, the empty weight was 1155 lbs. Since then, I’ve put in the electric nose gear, a few instruments, rear upholstery, and wheel pants. I’m guessing that the empty weight would be about 1175 – 1185 now.

Heck if I know how Nat got his plane to 1050 lbs, I think Al Wick has got the lightest Cozy MK IV out there by a few lbs, but even He didn’t get to 1050 lbs. On the other hand, I set my Max. Gross at 1155 lbs, so I’ve got 1000 lb. payload. About.

Brian DeFord writes: 11/15/04

Well, I guess I get the pig award for this one. I’ve had 2 very accurate weight and balances performed using electronic scales. Once was before I got the airworthiness certificate when I had only primer on the plane, no wheel pants, no spinner, and no upholstery. The panel was full of instruments and radios, electric nose lift, electric speed brake and 8 qts oil. Empty weight was 1173 lbs. I set my gross weight at 2100 lbs.

Then, after final paint (base coat and clear coat), full upholstery (nowhere in the cabin is there exposed fiberglass) with carpet, leather sidewalls, headliner, cloth seats over comforfoam at all four locations, wheel pants, spinner, overhead front and rear light console, a new, heavier GPS and new AM/FM CD player, the empty weight became 1326 lbs. I still have the 2100 lb gross weight limit that I impose on myself so that leaves 774 lbs useful load.

OK, I know that sounds horrible and I was shocked as well. I certainly didn’t think I would have added 153 lbs with what I just described, but I did and the scales didn’t lie. I’ve flown the plane at all weight conditions, full aft and full forward c.g. limits and it flies wonderfully. My mission is to comfortably carry 2 full size adults, full fuel and reasonable baggage on x-country trips or two adults and a couple of kids with full fuel. I can still perform those missions even with this weight.

## **RISK**

There is no activity in life that does not involve some risk. The challenge to each of us, if we wish to live a long life, is not to avoid activity, but to keep the risk as low as possible for those activities we engage in. When it comes to airplane building, the way to minimize risk is to not only select a design that meets ones needs, but select one that is well proven, strong, and does not require an inordinant amount of special skill to build and/or fly.

Some people like to brag about what they are going to do and some designers have been known to sell designs that have not been tested and proven. But our philosophy is to build and test first, and only then advertise. Our design is fast, efficient, strong, and easy to build with a minimum of skills, and has been well tested and proven. The engine we recommend (Lycoming) meets the needs of horsepower and weight, is easy to install, is well proven and reliable, and is easy to maintain and operate. The Lycoming reputation is not just talk, but is our experience in over 22 years of trouble-free operation for more than 1,000 hours and thousands of miles, and many others who have had similar experience. The installation of a Lycoming is thoroughly documented in the plans for any builder to follow, and any special parts required are available from the suppliers we recommend. If we knew of any way we could reduce the risk any further of building and flying, we would test it first, and only then talk about it and recommend it to others. This is not to suggest that some might not encounter a problem with their Lycomings, related to either installation, maintenance, or operation. But that risk can also be minimized by assiduous attention to those responsibilities.

## **ECONOMY/PERFORMANCE**

Do you know of any other 4-place airplane with only 180 hp that can cruise at 190 mph burning only 8.5 gph, or one with only 180 hp that has a top speed of 220 mph (actually 217mph)? I don't and probably you don't either. The secret to the Mark IV's exceptional economy and performance is the minimization of DRAG.

The top speed of an aircraft is determined by the speed at which drag forces equal the maximum thrust available. The drag force increases as the square of velocity, so it becomes increasingly difficult, with a fixed amount of horsepower, to make velocity increase at speeds over 200 mph. So if we are interested in maximizing performance, we need to know more about minimizing drag.

There are two basic components of total drag: 1) induced drag, and 2) parasite drag.

Induced drag is the side effect of lift. The force vector resulting from horizontal air flow over an airfoil is inclined from the vertical. The vertical component is called lift, and the horizontal component is called drag. Since they are proportional at any given angle of attack, one way to reduce induced drag is to reduce the amount of lift required. In other words, make the airplane as light as possible.

Another way to reduce induced drag is to choose a configuration which requires the least amount of lift. This is where the canard configuration is superior.

Consider the classic tractor configuration, with a single wing and a horizontal stabilizer in the rear. For pitch stability, the c.g. must be ahead of the center of lift, and level flight is maintained by an aerodynamic down load on the horizontal stabilizer. Let's say the load at the c.g. is 100 lbs and the download on the stabilizer is 20 lbs, then the lift from the wing must be 120 lbs to maintain level flight. Now the drag resulting from the 120 lbs of lift and the 20 lbs of download on the horizontal stabilizer are ADDITIVE! So the total induced drag would be proportional to 140 lbs of lift.

Now consider the canard configuration, with the horizontal stabilizer (canard) in the front and the main wing in the back. The c.g. must still be (and is) ahead of the center of lift, but horizontal flight is maintained by an upload (lift) on the horizontal stabilizer (the canard). Using the same load at the c.g. of 100 lbs, there is an upload (lift) of 20 lbs at the canard, so the main wing only has to supply a lift of 80 lbs. So, the net reduction of required lift with the canard configuration also results in a reduction of induced drag. In this case, the induced drag would be proportional to 100 lbs of lift, not 140.

But this isn't the whole story. The canard configuration is a more efficient package—the entire fuselage is used to carry the load, as compared to the classic tractor configuration, where the only function of much of the fuselage is to support the horizontal stabilizer at some distance removed from the wing. As a result, because of this extra structure with no purpose other than to support the horizontal stabilizer, the classic tractor configuration has a heavier fuselage and heavier wings to provide the increased lift. As stated several paragraphs above, the increased weight of the classic tractor configuration also contributes to its higher drag. The numbers used in the above comparison (100 lbs of load) do not take into account the higher empty weight of the classic tractor configuration, which also increases the required lift and corresponding induced drag.

The other component of drag is parasite drag. This is the skin friction of air flowing over the portion of the aircraft that is not contributing to lift. Since the classic tractor configuration has this long structure whose only function is to support the tail, it also has

more skin and more parasite drag. The thousands of rivets used in factory built construction only make matters worse.

In summary, the canard configuration has less induced drag, because it has no aerodynamic down loads, and is a lighter structure, and it has less parasite drag because it is a more compact structure with less surface area, and that is what results in its greater economy and performance.

## **NOISE LEVELS**

Mark Beduhn says that the CAFÉ foundation measured the noise levels in his Cozy Mark IV at 81 db at idle, 92 db at full power climb, and 96 db at cruise. He said he measured his Beech Sundowner at full throttle at 105 db, and a 172 Cessna at full throttle at 110 db.

## **AERODUCT AIR DUCTING**

There are 2 types of Aeroduct ducting. Cat and Scat have a single layer of either neoprene or silicone rubber impregnated glass with a steel spiral wire inside to hold them open. Ceet and sceet have two layers a glass with a steel wire between the layers. DO NOT use either ceet or sceet in reduced pressure applications, such as intake ducting. The inner layer has been known to come loose, collapse and block off the ducting and shut down the engine. It can cause quite a mystery, because after the engine-out landing, the duct opens up again and one cannot find the cause of engine shutdown. Flexible intake ducting was used in the Varieze and Long EZ designs, but not on the Cozy, except for carb heat. In that application, DO NOT use ceet or sceet.

## **CARB AIR FILTER BOX**

The air filter box shown in the plans attaches to the Ellison throttle body with 4 bolts. Recommended aircraft practice would be to install the bolts from above with the nuts on the bottom. Either way, either the bolts or the nuts would be inside the filter box and on the throttle body side of the filter, so if they came loose, they could be ingested into the engine. That is exactly what happened to Don Herzstein, during his 40 hour test period. One bolt came loose, was sucked into one cylinder, and did a job on that cylinder, and also his constant speed prop when the engine spit out the bolt. Although it ruined the cylinder, the engine kept running and got him back to the airport. Make sure you secure these nuts/bolts with either safety wire or locktite.

## **CARB AIR FILTERS**

We say in the plans and have discussed it in the newsletter, to install the throttle body so the slide moves from side to side, rather than fore and aft. This is to minimize the air disturbance as the slide goes to full open, and avoid a change in mixture which would cause the engine to run rough. Recently a builder who experienced a rough running engine at full throttle, came up with a simple fix. He put duct tape over the part of the filter that the ram air impinged on. This caused the intake air to circle around the rest of the air filter and enter the throttle body more evenly from all sides. How ironic! This is the area of the filter which gets the dirtiest, and the normal reaction (at least mine) was to rotate the filter element so the part of the filter that gets the ram air would be clean and unobstructed.

Robert Peplinski writes:

10/09/04

“My 0-320 H2AD engine with an Ellison Throttle body was running very rough at full throttle over 4,000 ft. After reading Ellison's web site that their throttle body needs smooth uniform air flowing past the metering tube, I assumed I had a problem with turbulent airflow in my airbox. To solve the problem, I placed a 5 inch piece of duct tape over the air filter where the ram air

impinges. I went flying this morning and climbed to 9,500 ft at full power. I was surprised that the engine actually ran smooth. At full power I was turning 2650 rpm with 130 kts IAS. The most I could run before was about 2500” Rob Peplinski

Brookfield, WI

## LETTERS FROM BUILDERS

Hi all, 10/04/04

I would like to publicly thank Ales Drajnc and Borut Pelikan for their hospitality during my visit to Slovenia. The guys are building quickly, and now have a tub, most of the canard, and some other parts complete after a year since they started. Very nicely built!

It all started when I got a research leave for Maribor University in Slovenia, and was looking at the builders map on Marc's website for a builder there. I found these two gentlemen, and contacted them. While I was there, we arranged for a meeting on a weekend.

These guys are extremely hospitable! They took me and my wife to a great restaurant, sightseeing in the old city, and then to the airport, where Borut took us for a ride in a Skymaster II. Then to their workshop where we saw the plane. They started by building up the workshop before the plane; they said it was a barn before, and the temperature can go to minus 30C during the winter there! They had to put in a lot of insulation, but it is nice, comfortable, and certainly a lot wider than the one car garage we are working in!

It sure feels great to see other people's work and discuss, especially in this part of the world (I am in Istanbul, Turkey), where not only Cozy builders, but homebuilts in general are not easy to come by. Thanks again for the hospitality. Ahmet Onat

Istanbul Turkey

Builders, 10/04/04

After 9 years of building, I am almost ready for the first flight in my Cozy III, and have solicited others to help me transition from Pipers to Cozys. Yesterday, I received my first hour flight in a Cozy MKIV at Rough River. That person was very generous to allow me to fly in the left seat and to make take offs and landings, plus stalls and steep turns. He showed me just how awesome a Cozy is, and I can't wait to get mine in the air. A little more experience and I will be able to do with my bird with hull insurance. The canard forum is really a great place to learn ideas from others and to broaden our horizons and to find others who are willing to help the rest of us along. This person (Marc Zeitlin) stayed a little longer than he anticipated on Sunday before heading home for the 4.5 hour trip, waiting for me to fly from Lexington, KY to RR in a Cessna 150. A special thanks to Marc for sharing his bird with me for my first flight. That hour was really one of the best times I have ever had. Matt Bunch

Lexington, KY

Builders, 10/04/04

First trip to RR and all I got to say is WOW! So that's what a real fly-in is like. Just wanted to publicly thank Marc for giving Jenny her first ride in a Cozy. She was still smiling this morning (Monday) and blabbering something about the need to get that "thing" in our garage finished! I was looking to rekindle the home-support flame, but apparently we hit the afterburner. Most Excellent!

Larry Schuler  
Wausau, WI

Builders, 10/04/04

I also owe Marc Zeitlin a huge "Thank you" for having taken me up in his Cozy and given me both a little stick time, and some

demonstrations of the characteristics of the aircraft. It'll take a few more days to wipe the smile off of my face ☺

Larry Wimble  
Crystall River, FL  
11/27/04

Builders,

For my birthday, I got a GREAT present. My wife, sister and staff bought a Craig Catto, 3-bladed propeller for our Cozy. It was to replace the very worn out Clark Lydick, 2 bladed Performance prop that I have abused for 4 years.

The prop was 3/8 inch thicker and I wasn't watching carefully and I stripped out a nut insert in the prop extension. Saber manufacturing of Granbury TX was on the ball with new nut inserts, 6 new prop bolts (the right size) with washers (extras) all within 2 days. The prop is great and matches my paint perfectly (white and blue).

It took 2 days to find enough good weather and time to do the 5 hours of flight testing with calculations for new performance numbers. Previously, I did flight testing with my son in preparation for the Air Venture Cup race of 2003. This gave me excellent comparison numbers.

- 1) Clark Lyddick Performance prop, 2 bladed, 68 x 76, with spinner from ACS: TAS 160 kts, 8000 ft, 2760 rpm (standard temp and pressure, medium load, mid CG, \_ fuel).
- 2) Craig Catto prop, 3 bladed, 64 x ?, with rough surface spinner: TAS 167 kts, 6000 ft, 2700 rpm, 8.5 gph (standard temp and pressure, moderate load, forward CG, full fuel).

Engine: Lycoming 0-320, 160 hp, Ellison throttle body, no mods. Per plans Mark IV with wheel pants.

Take off distance estimated at 2100 ft, 3 times with the same load, 2-3 kts wind at 3280 ft elevation, 19 C and 29.99.

There is a huge difference in vibration. The spring metal safety catch has quit vibrating on the canopy latch rod except at certain high idle rpms on the ground. The noise is reduced some also. At this point, I am impressed with the extra performance and smoothness. Thanks Craig! Kevin Funk MD

Lubbock, TX

Builders, 11.27.04

I have been doing some serious number crunching at work and have decided that I will need some extra funds. I have already drained some of my retirement accounts and still need to raise some funds for the next 1-2 years.

With a sad heart and a lot of trepidation, I would like to offer \_ ownership of my Cozy to a good person. I would request sharing the insurance (Avemco) and half of the yearly maintenance (\$250). I will allow the co-owner to have the plane at his home airport for 6 months per year, divided as we see fit. I will probably want it here during winter for the annual inspection in March. I will provide a check out and training for the plane.

The plane is 4 years old and has performed great, even on the smaller 160 hp engine. I have loaded it to 2300 lbs and flown into Albuquerque (6000 ft elevation) in the summer. It is full IFR with GPS, ILS, Navaid, and CD - radio.

Most issues including price are negotiable. I would like an option to buy back the partnership at the original cost in 1-3 years, based on when I can get my new business venture to be profitable.

How would you like \_ of a proven Cozy and your money back later? It's an offer that is awfully hard to refuse. You could be building while flying, trying before committing, or having a second plane that can outrun and outperform any SpamCan on the market. See my previous letter about the new performance numbers with the 3-bladed prop. Contact me at [kevinfunk@sbcglobal.net](mailto:kevinfunk@sbcglobal.net), or 806-

798-3818 or cell 806-790-0413 in Lubbock TX  
Kevin Funk

Builders, 11/25/04

A general tip on keeping neat edges on large layups. In many places the instructions say to make each ply a bit shorter, in order to avoid a bump in a multi-ply layup that would be a stress riser if all the plies ended at the same place. To keep the edges under control, I do them backwards. I make the FIRST ply the shortest, then each ply a bit longer. That way the edge of each ply is trapped by the subsequent plies and the only edge I have to get after is the last ply. With a little thought, you can even use this technique on spar cap layups. I haven't done my main spar layups yet, but it worked great on my canard. Doug Shepherd

El Cajon, CA  
11/17/04

Dear Nat,  
Just a quick note to let you know the Cozy is well established in San Antonio:

- 1) Gary Blancett (cell 884-3695) started last March and is already doing canard tips.
- 2) Jim Feighny (home 822-7229) is reviewing plans and making instructional piece.
- 3) Brad Doppelt (cell 380-2025) has fuselage on gear, main spar and canard complete, wings well along.
- 4) John Kent ((cell 481-7995) is reviewing plans.
- 5) I (Steve Carlson, cell 414-3809) am about ready to take the sides out of the jig.
- 6) Paul McReynolds (cell 697-1434) has built a Long EZ, at least one, I think.
- 7) Randall Klint (home 695-6624) reports he is making slow progress.
- 8) Jon Farr (cell 602-3351) has a flying Cozy and is making regular trips to corpus and other spots.

If you know of anyone else in San Antonio who is interested, let them know about our group. Steve Carlson

Ch. #35 president  
San Antonio, TX

Builders, 7/27/04

If your wife threatens divorce, I guess that pretty much forces your hand! But I bet you'll miss her!

Seriously, though, I happen to be one of the lucky guys. I live about 55 miles from Oshkosh on Wisconsin's east coast. After a wet and cool spring, summer finally arrived very late here., but the weather is beautiful—for the time being. Last year I had a chance to meet many builders. Today I had the pleasure of spending some time with Nat and Shirley, met some other builders, as well as Marc Zeitlin, who has arrived at Oshkosh in good shape (I noted he was wearing sandals today—no strings). It's nice to meet the other canardians, and hopeful over the next few days I'll meet many more.

The workshops are also good to attend, and just as educational, the vendors' booths. I've been an EAA member for several years, but I've been a builder for only one year. It's easy to say that for me, this is already the most meaningful AirVenture that I've attended.

I hope all of you, no matter what the distance, will someday get a chance to come to Oshkosh. I look forward to meeting you.

Bob Forster  
Manitowoc, WI

Builders, 8/26/04

Well, I'm on the road. I just received plans #1300. Think of it! 1300 sets of plans sold for the Cozy Mark IV!

The work area is nearly set up. As soon as I read the plans and get supplies, parts will be coming out of the "factory". Glad to be joining you folks!

Robert Withrow  
Swampscott, MA

Builders, 8/31/04

I am a "hope so" Cozy builder in California. Because of the time required to build a Cozy, I believe it is important to get buy-in from my wife. My marriage is more important than any airplane and I hope to have her join me in the build. Therefore, I am looking for a ride in a Cozy so that she can experience what it might be like. I would be happy to pay for fuel. We are near KMYV. Thank you for all the great info on this list and the builder sites.

Dana Dickey  
California

Dana, 8/31/04

I'm on my second canard plane and have survived my marriage just fine through both planes. For me the key reasons were for me not to become so obsessed with the project and mainly to balance your time between building and taking care of everything else, be it "honey do" stuff, family vacations, or whatever. Yes a motivation ride might help, but that won't necessarily last through the years it will take to build the plane. It is possible that if you do become so obsessed, and believe me it's real easy to, the project will be greatly resented by your spouse and she could even equate it to being another woman. I've seen that happen with several builders. Such an occurrence can lead to what some of us call suffering from AIDS, which in this case stands for aviation induced divorce syndrome. Oh, I should also mention that it helps if your wife is or becomes a pilot because she likes to fly.

Dick Rohaly  
Los Angeles, CA

Builders, 8/30/04

I had made up my mind from the beginning to stay out of "the Great Lycoming Witch Hunt" AKA Cozy Lycoming failure rate information. I believe no accurate conclusions can be drawn from such sketchy information.

However, in the interest of fairness, I decided last week to put the system to the test. I drive a lot in my work, so I surveyed autos parked by the side of the road. I obtained all the information I could about each car. In five days, I counted nine autos stranded, one Dodge, one Subaru, one Mazda, two Fords, and four GMs. I lumped the GMs together. A good statistical analyst makes up rules as he goes.

The only driver I was able to contact was the Dodge driver. As I approached, he was standing behind the guard rail with his back to the wind. He held up a single finger and waved me away. I assumed that he was signalling that he was number one. Those Dodge owners sure are an arrogant lot. The only category I could think of was insufficient restroom facilities.

One of the Fords had a large stream of oil leading from the road to the car. This is an obvious case of insufficient oil to complete the trip.

The Mazda and Subaru I classified as out of fuel. That is the only conclusion I could reach as everyone knows these makes never have mechanical problems.

Of the GM products, three had flat tires.

After much number crunching, the answer jumped right out at me. If you drive a GM auto, don't drive on Thursday. I forgot to mention I spotted the GMs on Thursday.

Oops, I drive a Chevy van. Not to worry! I'll put Chevy vans in a separate category. I didn't see any Chevy vans so I'm good to go 24/7.

This system really works when you have the right information. When you guys (auto buffs) finally get bored with this thread (collecting info on Lycoming failures), maybe you could calculate the winning numbers for the lottery. Now, that's some info I could use. Hurry, my delete finger is starting to cramp.

Colby Farmer

Colby also writes: 8/31/04

I looked at the NTSB records last year and almost all, if not all accidents, were due to the "loose nut in the left seat." If you guys are really concerned about safety, addressing pilot proficiency would be a great place to start.

Colby Farmer

Dear Nat, 10/27/04

I am a Navy pilot in Virginia Beach, VA and fly a Hornet. I have had a blast doing what I have for the last 15 years. 700+ traps later, I can see the end approaching. I had a long talk with you at AirVenture before I bought my plans, and you are one of the reasons I bought Cozy plans.

In the last 4 years I have done two sets of work ups and two 6 month deployments. I got my plans 2 years ago and am just completing chapter 4. I have periods when I can build for an entire day, and then not touch it again for 2-3 months, depending on my schedule, but I am now 58 hours closer to an airplane than if I had not built anything at all. By the time I retire in 5.5 years, I expect to have it on the gear and working on the wings. Whole lot closer to flying then.

Tom Robson

Virgina Beach, VA

Dear Wendell (a new military builder), 10/28/04

I was once enlisted, but went to the dark side in the Air Force (I am not a Capt.). I have been building off and on since '99. I was building in San Antonio, then moved to the UK last year.

I got away with my stuff being sent by the movers by telling them I'm building a "boat". So they shipped my open-ended canoe, with all the boxed up cowlings, canopy, strake leading edges, and engine parts. The only damage I've noted is a small crushed area to the left lower fuselage...an easy fix. The military will move a boat for you, up to 14 ft long.

I'D SUGGEST STARTING NOW. You can always skip around the chapters to best suit your situation. The weather isn't always ideal here in the UK so, for example, I built my turtleback in the dining room. It helps to have a supportive wife who wants you to hurry up so she can take trips in it. Hope this helps.

Terry Winnett

Lakenheath, UK

Builders, 10/27/04

Well, it's been a little over one week since I got my plans and almost two years after I received my info pack. Since then I have been to two Copperstates and met with one builder local to me, Jay Hegemann of Escondido. I spent about two hours at his shop two months ago looking over his bird and the wonderful progress that he has made. That day I made the decision to purchase plans. In 2003 I sat in Nat's plane and chatted with him and Shirley for a bit. I was impressed with his relaxed demeanor. Got a photo in the closed canopy cockpit taken by Nat. With the cushion removed, I was quite impressed with the headroom, since I am 6'1". Belated thank you, Nat.

Also, I would like to thank Brian DeFord for his patience at Copperstate 2004 as I salivated (with my 6'2" girlfriend) over his plane. We drove out so I could show her "this plane" that I had been going on and on about. She was very impressed as was I. I have been a fly on the wall in various forums, done my research, and met some great people. I am looking forward to the journey. Thanks guys (and gals).

Jerry Muntz

Moreno Valley CA

Hello all, 10/01/04

My name is Carlos Fernandez. I've wanted to build an airplane for sometime now---10 years. I wanted a plans-built composite airplane and found there aren't many that fill this requirement. Over the last several months and since Oshkosh 04, I have decided to build a Cozy IV.

A couple weeks ago I was able to try Robert Kittler's Cozy IV on for size and fly it. Cozy flyers know what it's like to fly a Cozy--fast, stable, etc. Thank you, Robert, for your time and enthusiasm!. I'm planning to start building in January, 05. Thanks for your time and support in advance.

Carlos Fernandez

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