

COZY NEWSLETTER #90 Jul. 2005

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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 3rd 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 latest copy of the Cozy newsletter and older copies, 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 (480)981-6401 and personal letters as well, but please enclose a stamped, self-addressed envelope if you expect a reply.

"Cozy" and "Cozy Mark IV" are the names given to airplanes built according to the plans and instructions of Co-Z Development (now the property of Aircraft Spruce). 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 Box 4000 Corona, CA 92880 (909)372-9555	Aircraft Spruce East 452 Dividend Dr. Peachtr City GA 30269 (770)487-2310	Wicks Aircraft 410 Pine St. Highland IL 62249 (800)221-9425
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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 Tipp City, OH 45371 (937) 669-2677	PO Box B Newton KS67114 (316)283-8662	14374 Olde Hwy 80 El Cajon CA 92021 (800)561-1901
7) Propellers Performance Props Box 486 Patagonia AZ 85624 (520)394-2059	Sensenich Props 2008 Wood Ct. Plant City FL33567 (813)752-3711	8) Prop Hub Exten. Saber Mfg. 3601 Nassau Ct. Granbury TX 76049 (817) 326-6293

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.
- 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
- 6) **Switching and breaker panel.** Wayne Lanza (772) 664-8953, 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) **Electric pitch trim.** Alex Strong (760) 254-3692.

PUBLICITY

We hope you will continue to send pictures of your new airplane to both Kitplanes and Sport Aviation. They say that

seeing what airplanes are completed each month is one of the favorite sections for builders—current and prospective. You should be very proud of your accomplishments.

Cozy builder Al Wick got a nice write-up on his Cozy Mark IV with a Subaru automobile conversion in the July 2005 edition of Kitplanes magazine

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) **Jacking up your airplane to change tires?** John Slade suggests lowering the nose to the floor, putting a padded support under one wing spar about 4 ft from the tip, and then flipping the nosegear down switch and watch the wheel come off the floor.
- 3) **Seat cushions.** Jack Wilhelmson reports that he bought a King size “temper foam” pad for \$83 including shipping from www.Overstock.com. Since they only have a Queen size bed, he cut off the excess to use in his Cozy seats. The price is the same for Queen or King size. The density is about 4 lbs per cu ft.
- 4) **Seat covers.** Nothing can beat sheepskin for comfort. By far the best deal is sheepskin seat covers at an auto store, like Pep Boys. With a slight alteration, they work just fine. Both authentic and imitation covers are available.

FOR SALE

1) Dennis Oelmann (a master builder) writes: 11/15/04

I have a set of wings, spar, and canard for sale. The wings are match drilled to the main spar and the winglets are attached, and the rudders and ailerons are balanced and hinged. 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 Oelmann. FLYCOZY@AOL.COM. (319)231-2635.

2) Carl Denk writes: 6/02/05

I HAVE FOR SALE A Lycoming IO-320-B1A 1015 SMOH with 42 hours on new Lycoming Nitrided cylinders for \$13,000. The engine is in an airworthy Cosy, and can be flown or run and inspected. Cdenk@ix.netcom.com. (216) 458-5598.

TRAVELING TO (and from) SUN n FUN

There is an old pilot saying: “Leave as soon as you can, and then go as far as you can.” That is what we always try to do. So a week before our earliest departure date, we began following the forecasts on the internet. In the spring of the year, the weather thru Texas and along the coast can be a little dicey—especially for VFR flight. So sure enough, we saw a clear period coming up and we jumped on it (This was on a Saturday, a week before Sun n Fun). We got up early, took off about sunrise, and made a beeline for College Station, TX. The weather was superb—not a cloud in the sky, and we even had a tailwind. We flew for about 5 hours at 2450 rpm, and then stopped for fuel. After attending to our duties,

it was up, up, and away again, and 3.5 hours later we were landing at Mobile, Alabama. Still perfectly blue skies with nary a cloud anywhere in sight! There was a 2-hour time zone change between AZ and AL, but even though we could have made Lakeland before dark, there was no rush, so we overnighted in Mobile. Mobile Downtown is one of our favorite stops, because the FBO always gives us a curtesy car (a brand new one) and we stay on the eleventh floor of the Adams Mark hotel, overlooking the bay. This time, however, there was some highschool athletic event going on, and everything was booked, so we had to hunt down a Hampton INN about 20 miles away. The next day (Sunday) we continued on to Lakeland. Again, perfect blue skies. We parked at our exhibit space (AC-2), and called for a pickup. Arriving in Lakeland a week early was not a problem—we just took a little vacation in the Orlando area.

Wouldn't you know, when Sun n Fun finally started, there was really bad weather north and northeast of Florida, which kept many homebuilts away.

Going home was not quite as neat. Watching the progress of weather at Flight Service, it looked as though after Sun n Fun closed on Monday, it would be impossible to get through the bad weather forecast for the gulf states for a whole week. Remembering the adage, “Go as far as you can as soon as you can.” we decided to leave just before the airshow on Sunday. The weather was great as far as Baton Rouge, LA, so we decided to overnigh there. The FBO (Louisiana Aviation) is also one of our favorite stops. This time the curtesy car they loaned us was a Lincoln! The next day the forecast was not very good. Low clouds were forecast for western Louisiana and Texas, and it was IFR along the route we normally take, so we had to deviate to the north, to Waco, where we stopped to wait for ceilings to raise. We were advised to continue on a northerly heading to get around the weather, so we headed to Abilene, Lubbock, and Texaco. There was a big cumulonimbus there, which was pretty much surrounded by clear skies, so we navigated between it and a restricted area and then headed for Albuquerque. By this time we had had it, and decided to stop overnight. Fuel there was the highest for our whole trip—\$3.96/gal. The next morning the weather was clear, but you wouldn't believe the headwinds! Up to 45 kts at one point. And we hit mountain waves like we had never experienced before! At 10,500 ft. we were going up at 2,000 fpm with our airplane pointed down.

This trip made us grateful for several things:

- 1) We have a fast airplane which allows us to fly around bad weather—sometimes quite a distance, and overcome some severe headwinds.
- 2) We have a reliable airplane. One which doesn't require a lot of upkeep, and
- 3) We have a **reliable engine!** We have been flying since 1982 with Lycoming engines, and great distances since we moved to Arizona in 1985—to Sun n Fun, to Arlington, to Minnesota and to Oshkosh. Always over mountains. And our Lycomings have never missed a beat! We have even flown over portions of the Gulf. Some of the automobile guys make fun of the Lycoming. They call it a Lycosaurus. But none of them can ever claim the kind of a track record we have demonstrated with the Lycoming. You don't see them with their auto engines at Sun n Fun, or Oshkosh, even though they don't have to fly over water or over mountains. And you hear stories about all the problems they are having just trying

to get them to run reliably, much less provide the performance it is so easy to get with a Lycoming. We have heard of one who hasn't even been able to fly off his 40 hours around his own airport. We have demonstrated how builders can have a fast, reliable, safe, long-distance airplane for a minimum amount of money and a minimum amount of effort. If builders are looking for something else, more power to them (no pun intended).

SUN n FUN

We always enjoy Sun n Fun because we see some builders that we only see there once a year, and also friends I worked with at 3M who have retired to Florida, who always stop by, and this year was no different. We only got out to the flight line once, but there were Cozys coming and going all week. There must have been 10 or more.

We were pleased to learn that Steve Wright, of nose-lift fame, who purchased a set of Mark IV plans and then went on to design his own "Stagger EZ", won the Grand Champion award.

The Wilhelmsons (nose lifts, safety catches, NG-6s, etc) were staying with us, and they and others helped to man our booth and entertain prospects so we could tour the exhibits. We learned that Duane Swing (Velocity) and Wayne Lanza (Composite Design) have teamed up to import a LSA from Europe. And we toured the ultralight area to look at some of the other LSAs now available. There was a 2-place, 3 surface canard (the "Freebird Xtreme") which claimed to meet the LSA specs, but the demo model was way too heavy, and priced at \$134,000, ready to fly.

The Cozy barbeque on Friday night was a huge success. Over 100 builders and would-be builders attended. Larry Wimble did an excellent job. The hamburgers and brotts (and beer) were excellent, and there was more than enough to eat and drink. It looks like this should become a popular annual event.

This might have been our last Sun n Fun. We are getting along in years, and it can be tough on us. I think we come farther, at least in our own Cozy, and more often, than any other builder, and now that Aircraft Spruce has taken over plans sales, we don't have quite the incentive. By the way, this year is the 40th anniversary of Aircraft Spruce. It started business 40 years ago when Flo Irwin (Jim's mother) purchased a car-load of Sitka spruce from Canada to help airplane builders.

ENGINES

At Sun n Fun, just opposite our exhibit, Eggenfellner was exhibiting his Subaru conversions. There were 4 RVs there with his firewall forward installations. The installations all looked very neat. It was also noticed that all the RVs, even though they are not fast airplanes, had MT constant speed props. We are hearing that you really need to turn up the Subaru to a high rpm to get reasonable take-off power—a fixed pitch prop just won't hack it. Let's see—with a \$23,000 firewall forward installation you still need to spend \$8,000 to \$10,000 for a constant speed prop, to duplicate what a \$20,000 (or so) XP-360 will do. Hmmmmm!

FINISHING CONCERNS

Some finishing concerns were expressed on the internet. If you do not use peel ply, you are dealing with a rough-weave surface. When you sand this surface in preparation for filling and contouring, you should not sand through the glass, but stop when

the high points are roughed up. Then if you fill the weave with micro, and sand again, you will be stopping when you reach the roughed-up high points, so the fill will basically be left in the shiny valleys. One builder who had purchased an airplane built by someone else said he had a problem with little particles underneath his paint job coming loose.

There are several ways to avoid this. First of all, polyester based fillers (like featherfill and bondo) do not attach well to epoxy surfaces. You should avoid these at all costs, or you will have trouble later on. The material recommended in the plans for filling and contouring, namely the "West System" epoxy bonds well to cured epoxy and should prevent this problem from occurring. One builder said he likes to apply micro fill at the knife trim stage, when the micro is not completely cured so he gets a good chemical bond as well as mechanical. But a caution is in order: Don't spread dry microspheres on a wet layup because they could draw epoxy out of the layup and the microspheres would not be well coated with epoxy.

Of course, if you use peel ply, then you will have a relatively flat and non-shiny surface which should provide a good bonding surface. It is still recommended to rough up this surface and use the "West System" epoxies for filling and contouring.

After filling and contouring, it is recommended to use a high-build epoxy primer. The one we used (from Viking Paint Co.), was available in two different colors. They could be mixed together to provide still a third color. Using several layers of primer of alternating colors, and sanding in between applications, was very useful in determining when all low areas had been leveled and it was time to apply the finish coat.

WINTER CABIN HEAT

A builder who is not yet flying asked if there was a way to keep toasty warm at 18K in the winter?

Ken Brimmer, who has been flying for many years, replied: "Yesss Siree,

- 1) Two pair of socks with the hunters chemical foot warmers and sheepskin boots.
- 2) Two pair of thermal johns (they say that if the inner pair is silk it will help wick the moisture away).
- 3) Ski pants.
- 4) Thermal top underwear with fleece pull over.
- 5) Sweater only on top as the sun will warm you pretty well.
- 6) Glove for left hand (near the canopy latch door).
- 7) Only fly SOUTH and plan to stop every two hours. Do not make it over two hours as you will not be able to get down to the necessary equipment to use a "piddle pack" – not only that but cold hands will freeze everything they touch. Try it and the next FBO will know what you have been doing by the stain.
- 8) Temperature will get warmer 12 – 15 degrees every two hours south. This has been tested to 24 deg. this year and 27 deg last year. We usually do not get this cold here in Maryland, except when we go on our winter vacation. We seem to make it a point to leave on the day we should already be there. Without adding a lot of weight to the plane, I have not heard of a good heater for a northern EZ. In fact I have been flying so long with the plane like it is that I would not go through the effort now."

Curt Smith writes:

"I experimented with heat options this past winter. The stock, plans system does pretty well if you don't have many (better if you don't have any) air leaks up front and/or around the canopy. I tried different blowers and they didn't help noticeably, so I took them out of the system. Also tried an electric heater someone gave to me, because they didn't think it provided much heat. They were right and it's now out too. Without getting too exotic, the stock system and no leaks is a pretty good ticket.

Ken Brimmer's suggestions are good ones, too. I also use a heated jacket when it's really chilly and there isn't much sun. You would be very surprised how warm the rest of your body stays, including extremities, if you're pumping warm blood (provided by a heated jacket or vest) and aren't getting blasted with a cold air stream."

OSHKOSH 2005 (AIRVENTURE)

We will be exhibiting our N14CZ Mark IV at Oshkosh again in our usual spot—just outside the south door of the Aircraft Spruce Booth in Hangar A. This will mark our 33rd consecutive presence at Oshkosh, and our 24th consecutive year we have exhibited our own homebuilt airplane—our first was a Varieze in 1978. We haven't decided for sure, but this could well be our last year exhibiting (at least commercially) at Oshkosh. We hope to see a lot of builders and Cozys there. We are especially looking forward to seeing Kim and Darryl Lueck's Mark IV. Maybe Marc will stop on his way to Mojave.

We will be back on the forum circuit again after last year's sabbatical. The forum will be on Friday, 7/29/05 at 1:pm in the forum area. The title will be "Canard Aerodynamics Applied To Cozy Designs". Hope to see y'all there!

Need a place to stay? Contact Brian Johnston (920)426-4955 His son has a 3 bedroom house about 1 block north of the airport.

Cozy dinner? We are waiting to hear from Kim and Darryl. We expect they are arranging it at Robbins restaurant for either Thursday or Friday evening.

INTERNET – RIGHT OR WRONG?

You have to be careful about what you read on the internet. Sometimes the information is correct, and sometimes not. You have to be able to tell the difference between wheat and chaff. Here is a good example: Here is what two different builders wrote.

Wrong:

"The best cooling system for an air cooled engine is a pressure stagnation system. The highest pressure possible inside the cowling is the stagnation pressure. Many people believe that placing ramps inside the cowling can help cooling. This only helps when the baffling design, and cowling shape inlet and outlets are poorly designed. Once these are properly designed, delta P across the cylinders from the high pressure side to the low pressure side is what will cool the engine. For a parallel valve Lycoming, delta P is ~5 inches of differential water pressure from the high to the low pressure side.

Airflow will not cool the engine. Many people have a misconception that airflow is what cools the engine because they use an airspeed indicator to take the data. The data from an airspeed indicator must be converted. I use a water manometer and read the data directly. WHAT COOLS THE ENGINE IS THE EXPANSION OF THE AIR AS IT ABSORBS THE

HEAT. $PV=nRT$ (natural gas law). The function of the airflow is to remove the heated air so that new cold air can take its place. The major means of cooling is air expansion. OK so, many are thinking well, why does going faster increase cooling? Because it increases the pressure in the cowling. Once the cowling pressure reaches the stagnation point, it doesn't matter how much faster the airplane goes because there is no more room for more air:

CORRECT:

"Pick up any college heat transfer text and read the first two chapters. I've never heard of the so-called "stagnation cooling" idea, so I'm not sure where it came from. I can just say that it is true that the greater the pressure differential (delta P from inlet to exit) the greater the mass flow.

This theory of stagnation cooling and $PV=nRT$ is just plain wrong. We are not flying refrigerators. If this theory were true, we would heat the front side of the engine and cool the back side with a net heat gain due to lost energy in the flow. I'm sorry, this is just plain wrong.

Air cooled engines are cooled by forced convective heat transfer. Convective heat transfer is a function of the mass flow rate, the boundary layer thickness, the diffusion coefficient, the contact surface area and conduction coefficients for the donor heat source. To maximize cooling, you want to move the largest possible mass of air past the largest possible surface area with the thinnest possible boundary layer and at the highest possible temperature differential. Now the practical side of this is that you want to minimize the head loss in the flow and create the minimum drag possible so you don't use more power than is necessary to get enough cooling. For maximum cooling you want turbulent flow, for minimum drag you want laminar flow. The trick is in getting the proper compromise between all of the factors increasing heat transfer and those increasing drag."

LETTERS FROM BUILDERS

Tony Rothwell, our Australian builder/pilot sent us a picture postcard from Japan. It showed a lighted sign on the main street of Tokyo (Ginza Street), "Ginza Cozy Corner".

He writes:

Photo on the "Ginza" shopping street in Tokyo. "Cozy" joins all the world's biggest brand name icons. Appealed to me!

VH-COZ now has 830 hours across all the states of Australia. Still having great fun. Brenda says I can go to OSH'05 and got a frequent flyer ticket to LAX, so hope to see you there!

Tony Rothwell
Australia

Builders,

5/23/05

Don't drive your canard into a big hole! Unless you want to make some new friends.

Saturday May 21, 2005, Regina (my wife) and I flew my Cozy Mark IV from Oshkosh to a pancake breakfast in Racine (hosted by EAA chapter 838). After eating breakfast, talking to some pilots and touring their museum, we got in the plane to go home. I had just started to taxi the plane when I knew something was wrong. I heard a crunch then the nose of the plane dropped to the ground. My immediate thought was that the nose gear had accidentally retracted, but then I realized that my nose wheel had dropped into a tie down hole (or chasm you might call it). For

some reason, in that part of the apron, there were 9" square holes that were 4-6" deep for each tiedown. I got out of the plane and was astounded to see the extent of the damage to my plane. The nose gear had collapsed, ripping the nose nearly off, and there were damaged pieces of foam and fiberglass all around the nose of the plane.

Needless to say, I was very upset. My first reaction was disbelief that someone would be so stupid as to put these huge holes all over the place for planes to fall into. My second reaction was the realization that my plane was not flyable, and my wife and I were stranded in Racine. Within a minute or so (I was still ranting about the holes) some of the local EAA pilots came over to our aid. They quickly volunteered to help in anyway that they could. One pilot offered his hangar. Another volunteered his epoxy, glass and tools (he is building a Lancair), others got dollies, ropes, and materials to tow my plane to a hangar, etc. After finding out that my plane had a home and I had supplies to fix my plane, I thought about ways to get Regina home. Before I could say anything, a pilot volunteered to fly Regina home in his Cessna Skymaster.

Wow! In a matter of 10 minutes everything needed to repair my plane was arranged, and my wife had a ride home! Then to top it off, another pilot said his wife was out of town, and I could spend the night with him until my plane was fixed. I was humbled by the generosity and the "can do" attitude of my fellow EAA members. My vision of commuting back and fourth between my home and Racine for several weeks to repair the plane, was changing to the possibility of getting my plane home in a couple of days.

When we got my plane to the hangar, we supported the nose with jacks and a wood 2 x 4. This allowed us to try to make the broken pieces fit back together again. It quickly became apparent that the repairs would be fairly straight forward, and that nothing difficult to repair had been damaged. Steve Myers and I worked for the next couple of hours glassing the inside of the nose and repairing the nose gear support structure. Steve then had to run some errands, so I stayed behind and warmed the repaired areas with a heat gun to speed the curing process.

While I was curing the epoxy, I started to realize that I was getting pretty hungry – nothing I could do about that though. Sure enough, I had no sooner had that thought when Sean Dwyer drove up and dropped off some sandwiches and a soda for me to eat! When Steve returned to the hangar, the epoxy was cured, I had the brakes hooked up, and I had tested the electrical systems. All that was left was to epoxy some of the exterior skin (purely cosmetic). While I was sanding the areas to be repaired, Steve mixed the epoxy and had some more glass cut into 2" strips. Within 15 minutes we had the job done.

Again I used the heat gun to cure the epoxy while talking to Sean and Steve. The more it hardened, the more I thought about leaving before the thunder storms that were headed our way arrived. By 7:15 pm the epoxy was cured and we agreed the plane was air worthy. So, I fired up the engine, took off, and was home 25 minutes later.

Hard to believe this adventure started and was over within a little over 12 hours. Needless to say, I have a warm spot in my heart for the pilots who helped me out in this difficult situation.

Mark Beduhn
Oshkosh, WI

PS: Had my plane been metal instead of fiberglass, it would still be in Racine. I don't even want to think about what having a metal propeller up front would have cost to fix! Another great feature of these planes is how easy they are to repair. Canards rule!!

Builders,

5/19/05

Here are my thoughts on why to use a Lycoming. Lycoming engines are designed with a long stroke (how far the piston travels on each stroke). Auto engines, including rotaries, are designed with a shorter stroke (yes, rotaries have a stroke length). What does this do?

A long stroke engine has more leverage (picture the offset on the crankshaft being longer, providing more leverage to the piston). So, a long stroke engine can have a lot more resistance applied directly to it. That is why it develops its horsepower at a lower RPM (and can drive a propeller directly).

A car has a very sophisticated transmission to only apply a certain amount of resistance at a given RPM. Exceeding this is called LUGGING the engine, which means the combustion chamber pressure is way too high for the design of the engine. Lugging an engine greatly reduces operating life. In a car, when you apply full power, your tranny drops into 1st gear. You may be able to duplicate this with a full feathering prop, but not likely. Diesel engines also have long strokes to manage their higher combustion chamber pressures.

We all know that you'll feed your auto engine prop through a PSRU. But this doesn't help much because, even though you reduce the drag torque on the engine, the combustion chamber pressures must be increased to achieve the higher RPM. This actually increases horsepower, (hp=work x time) while decreasing torque (torque = twisting power) to the prop, and the only thing that makes your airplane go is torque to the prop.

The long stroke Lycoming can handle the power needed to turn your prop @ 2500 rpm without overstressing, over-revving, overheating, overweighing, or requiring an overly complicated installation.

The short stroke of the auto engine is designed for quick rpm changes to give you that snappy responsive sensation, not carry a full load for extended periods of time.

If you were building a car, it would be ridiculous to put a Lycoming in it. I chose a mid-time Lycoming factory overhaul for my 0-360, I paid \$8,500 ready to go (except for light weight accessories & Ellison TBI. I am now working on wiring, avionics, fill and paint.

Al Holland

Ramsey, IL

NEWSLETTER TERMINATION

It is getting more and more difficult to find new things to write about in the newsletter. There haven't been any design changes since we sent out new canard incidence templates in Newsletter #80 (extra copies are still available if you send a SASE). We monitor Marc Zeitlin's unofficial Cozy newsgroup, and most of the subjects being discussed have been discussed many times in the past, both on the internet and in newsletters. A compendium of past newsletters is available from Aircraft Spruce and is archived in Marc's Cozy web page. And there are other resources available to Cozy builders, such as a canard newsgroup and Central States quarterly newsletter. So we have decided to discontinue our Cozy newsletter as of the October 2005 issue. I will still be available to answer any design questions by U.S. mail, internet (cozy@extremezone.com), and telephone (480) 981-6401. On the

internet, make sure the subject is "Cozy" so my internet provider does not intercept it as spam.

We will no longer accept new subscriptions or renewals. We will send out the last newsletter, #91, to all who have subscribed thru #90. And we will refund all who have subscribed past newsletter #92, **provided you send us a self-addressed stamped envelope**. Extra copies of recent newsletters will be available at \$2/ea as long as our supply lasts.

It has been a real pleasure working with builders, and helping people build a wonderful and safe cross-country airplane. We wish to thank Burt for developing both composite and canard technology, and his encouragement to us to commercialize the side-by-side concept, and we are happy we resisted his efforts to get us to stop selling plans at the same time he withdrew from the home-built market in 1985. We hope Burt's "moldless composite" technology will continue long into the future in the Cozy designs.

Co-Z Development Corp.

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Mesa, AZ 85215