

THE COZY NEWSLETTER #8 January 7, 1985

Published quarterly (,Jan., Apr., July, Oct.) by

Co-Z Development Corp.

2182 No. Payne Ave.,

St. Paul, MN 55117

Subscription - \$5.00/yr.

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The Co-Z Development Corp. wishes you a most successful and prosperous New Year:

It is mandatory for all Cozy builders to subscribe to this newsletter, as this is the only formal system we have for communicating plans changes and/or corrections, builder hints, and other information of interest to builders and prospective builders. Issues prior to No. 4 are not necessary, in that they were only reports on the progress of plans, and extra copies are not available. Starting with issue No. 4, the newsletter contains important builder information. We will try to keep the subscription price low, so cost won't be a problem.

When writing to Co-Z with questions, please send along a stamped, self-addressed envelope. Please leave space after each question, so we can fill in the answers (without having to rewrite the question) and return on your original.

If you call, please call me at home (612-776-1145) after regular working hours (I work at 3M for a living during daytime), or on weekends. We have visitors dropping in to see the proof-of-plans model in our garage or the prototype hangared out at Anoka Co. Airport, 20 miles away. So far, we have

been able to handle it.

The following prices are effective at the present time:

Information kit \$8.00

Newsletter \$5.00/yr.

Plans \$210.00

We have not as yet programmed our computer to print expiration dates on the mailing labels, so we hope you remember to resubscribe when due without a reminder.

ABOUT THE PLANS

When you receive your plans, don't neglect to sign and send in your license agreement (Chapter 1, Page 4), so we can issue your serial number. Many of you haven't done this yet. Also, don't neglect to mark in the corrections published in the newsletters. In spite of our best efforts, errors do creep in. If you find any, be sure to let us know and we will publish them for everyone's benefit

Please check your plan; when you receive them to determine that there are no missing pages. So far, we know of only one case where this has happened. We don't want anyone leaving one whole page out of construction (The manuals were put together by the printer. We try to check each one out before shipping).

The plans were laid out in the same sequence as the Long EZ plans. You will find, however, that there are some detours. For example, you should not attempt to install the landing gear before the centerspar is installed, and it is much easier to jigbore the centerspar to the wings before the centerspar is installed in the fuselage, which means that you will have to build the wings before installing the centerspar and gear. Also, it is easier to do the turtleback and canopy before building the strakes, although not absolutely necessary.

Some of you have asked whether there will be an extra charge for Section IA of the plans. it was planned that Section 1A would be included in the original purchase price, but that the engine installation manual would be separate, as it is with the Long EZ. We have since decided to include the engine installation instructions in Chapter 23 of Section IA. This will make Section IA substantially larger than originally anticipated, a little more expensive to print and mail, and deny us a chance to charge you a little more money. It made such good sense to do it this way, however, we decided to take our lumps.

If you have questions, please make sure that they aren't already answered in the plans, or newsletters. Don't expect to understand everything perfectly on the first reading, particularly if you have just received your plans, and haven't even started the project yet. Very often the instructions presume that you have completed preceeding chapters and have developed a basic understanding of how things are done, without having to return to square 1 each time.

Thanks to those of you who have commented on the plans being very complete and well done. We have been trying as conscientiously as we can to find the best way to do each step explain it in detail, avoid poor grammar and misspelled words, and type-set it for easy reading. It helps to know that our efforts are appreciated.

WHAT WE HAVE BEEN DOING

In Newsletter #7 we told you that our top priority was to complete Section 1A of the plans. It was. We were hoping to have them printed and in the mail by now, but that was not to be. We can report, however, that everything is at the printers except for several pages which are stuck at the type-setters still as of 12/31/84.

We ran into an unexpected problem. Our builder friend out in Oregon, Jud Porter, who was so helpful in the beginning, getting us set up with a TRS80III computer for word processing, typesetting from our diskettes, teaching me how to paste everything up, and then doing the printing, moved to El Paso and no longer had access to all the equipment required to do these things. So I had to find local sources who could handle my computer output. That's where the problem came in. No one that I could find was set up to handle my computer language. I did find a local company who was anxious to take on additional work, and convinced me that they

could adapt their system to Scripsit (or Ascii) language. But then all the communications programs we could buy, beg, borrow, or steal just didn't work. We lost over a month just messing around and had almost decided to retype all 80 pages on a different computer, when we found a programmer who was able to write the necessary program and we got the whole thing to run. We were sure relieved!

Section 1A is 80 pages 11" x 17", with too many illustrations to count, a bunch of pictures, an awful lot of words, and 8 more large size 17" x 23" drawings for jig templates and engine baffling. This manual contains everything else you need (instructions, that is) to finish your airplane.

We intended originally that the engine installation would be a separate manual, same as Burt did for the Long EZ, but after some further thought, it seemed like a lot of duplication of effort and unnecessary complication to split out everything pertaining to engine installation, because portions of the work logically belonged in a number of different chapters. A further consideration was that all of this writing and drawing is getting a little bit tedious, and we were anxious to keep it as simple as possible, and finish it as soon as possible. So we put everything in Section 1A. There will be no additional charge. (We won't turn down any contributions, however toward printing and mailing costs.)

BURT'S WEDDING

I'm not sure how many of you noticed, but Burt Rutan was escorting a very nice looking young lady, Margaret Rembleski, around Oshkosh last summer, and a couple of months later we felt quite honored to receive a wedding invitation.

Burt must have met Margaret during one of his many trips to Wichita, while designing the Beech Starship I and consulting with Beech on establishing their production facilities for the Starship. She is the daughter of one of the top Beech executives (the acting president, I think).

At any rate, the wedding was set for November 17th in Wichita. We debated whether to fly or drive, but weather being what it is in Minnesota, we decided to play it safe (I had to get back to work) and drive. The weather driving down was simply gorgeous, and we felt pretty dumb arriving by car when almost all of the other guests flew in. Beech dedicated an entire hangar (a large one) just for the aircraft of the wedding guests. It was filled with homebuilts--Variezes, Long EZs, a Defiant, a T-18, a Glasair (John Murphy), and even a few (excuse the term) factory builts. John Roncz, Burt's airfoil genius, flies a twin engine something or other. It was like a little Oshkosh, but in a most unlikely setting, the Mecca for factory builts. As a matter of fact, I couldn't help but think that there was more to this event than just the wedding of Burt and Margaret. Actually it was the wedding of homebuilt and factory build design and technology, as we were to learn shortly.

Burt had arranged with Beech to take his friends on the first public tour of the Starship I engineering and production facilities at Beech. You might say it was the highlight of the trip. It took awhile for the immensity of the project at Beech to sink in. The Beech factory facilities are located on their private airport, as you might imagine. The facilities had been almost doubled in size to accommodate the Starship, and the city provided the financing with municipal bond money. We were taken around the airport in vans, to first one building and then another. The space devoted to the Starship could best be described in terms of the number of football fields--I would guess 5 or 6.

The first stop was the "showroom" hangar, where a full size model Starship I was on display for sales purposes. (The flying model was still at Mojave being flight tested). The display model was a non-flying model, built from something other than graphite, Nomex, and epoxy, but you couldn't tell it from looking. The cockpit was completely furnished with real instruments and avionics, and the cabin was completely furnished with plush, swivel, reclining chairs. Everyone had to go inside, sit in the cockpit, and sit in the cabin. What a beautiful airplane!

Chuck Richey, a close friend of mine who works for Scaled Composites, explained why the Starship has a variable sweep on the canard. Burt was able to get a ridiculously low landing and take off speed by employing large flaps on the main wing. But the large flaps, because of all the extra lift they generated, would have caused a large trim change. But by changing the sweep on the canard, both the area and the span of the canard are increased, and the center of lift is moved forward, so there is no change in trim. This is a very clever idea no one else has thought of yet, so Burt was able to patent it!

Our next stop was the engineering hangar. This is where the engineers plied their trade. They had built two full size, nonflying airplanes to work with. The first was built completely out of heavy aluminum members to mock up and test all the mechanisms, i.e. the gear retract system, control linkages, flaps, canard sweep-changing mechanisms, etc.

The second model was a full size plywood and balsa wood skeletal model. It was a look-through airplane whose purpose it was to make sure everything would fit inside. This hangar was really a homebuilders heaven. You could see everything there was to see about the airplane and how

everything worked. You could even recognize things like rod ends, cables, and tubing--the same neat things we use.

The next stop was the tooling area. By "tools" we aren't referring to hammers and chisels. We are referring to female molds, mounted on steel frames made of 8 inch I-beams, that full size whole pieces of real airplanes are laid up in. There were so many! Bottom of left wing, top of left wing, ditto right wing, ditto canard, then fuselage and many smaller components. Each mold was perfection personified. No patches, No fill. No pinholes. No bubbles. Just a perfect rendition of the final shape with a perfect finish.

We were told that there was a facility in Detroit, computer operated, which would carve the entire airplane, a piece at a time, full size out of solid mahogany. These carvings were then checked for accuracy, and a "flashing" was made. From this, they said, they made a "cathode" (plug?), and from this they would make the final female mold.

For the fuselage, they were developing different molding techniques in parallel. The first was to mold two halves out of sandwich carbon fiber cloth and Nomex, and then bond them together. The second was to mold a complete fuselage inside a complete closed mold, using carbon fiber windings. They had finished examples of both techniques. After curing, they inspected every square inch of the composite structure ultrasonically to insure that there were no unbonded areas. They use entirely "pre-preg" materials which are vacuum-bagged and have to be cured at high temperatures.

One couldn't help but be impressed with the magnitude of this project and the quality of the workmanship. Beech would want to use the same tooling for other models, I imagine, and the logical extension would be to come out with a twin jet model.

The wedding was a very lovely affair, before a packed church. The bride was beautiful in her gown and Burt simply beamed throughout the entire ceremony. It sure seemed strange to see Dick Rutan (best man) in a black tux!

The reception was held in one of Beech's social halls. There was much food, wine and champagne, and all of the homebuilder types gathered together at one very large table--the Dickey's, Melvills, Richeys, Brocks, John Murphy, John Roncz, and others. We were entertained with an impromptu piano concert by John Roncz. The man is amazing! He would put Liberace to shame. Apparently, when one is a genius, it shows up in everything one does.

The next morning, everyone was shocked to awake to zero-zero visibility and ceilings. We all met for breakfast, and then Shirley and I left in our auto for St. Paul. Everyone else was weathered in for 3 days. It would have been just great to park the Cozy in the Beech hangar, near Starship I, but it also would have been tough explaining to 3M why I was 3 days late returning from Burt Rutan's wedding. In the last 6 years of flying homebuilts, we have been fortunate indeed to have made the right decisions about weather.

OTHER DESIGNS

A couple of weeks ago the national TV news network had a feature on the latest development in military aircraft. You might imagine, the new F-29 will have a canard, and they are adding a canard to the latest model of the F-15. Of course, biz-jets and biz prop-jets are already sprouting winglets (Gates-Learjet 55, Challenger 601, and Gulfstream III & IV) and canards (Avtech and Omac). Probably won't be long before we see the commercial airliners following suit and claiming that they, too, invented these things. Isn't it nice to be in the forefront of aviation history and technology?

COZY PUBLICITY

There is a rather nice article about the Cozy in the December issue of Homebuilt Magazine with a large color centerfold and a number of excellent black and white detail photos. The article is the result of an interview we had with Keith Connes in Oshkosh, and the subsequent flight testing he did. Keith also reports on his interview with Shirl Dickey after the CAFE 400.

We are still waiting for some CAFE 400 and Oshkosh coverage of the Cozy in Sport Aviation. Shirl Dickey, and Al and Cathi Yarmey submitted manuscripts on their impressions of the Cozy, and Sport Aviation took a bunch of pictures at Oshkosh this last summer.

WHAT OUR BUILDERS ARE DOING

In our previous newsletters, we had promised to send advance copies of Section 1A to anyone who needed them, provided they sent us pictures of their projects. Wouldn't you know, shortly aft one of these we got a letter from Merle Musson, in Isabella, MO, with a picture of him sitting in his Cozy, holding up a sign saying "SEND PLANS!" Here's his letter:

Dear Nat and Shirley,

Well, I am finally running out of things to do on my Cozy. Enclosed are three photos which were taken in the middle of Oct. one shows my Cozy fuselage in a mall in Mt. Home, Arkansas. Our EAA chapter in Mt. Home had a weekend show. The other photos show the wings, canard and the fuselage with finished strakes. I would appreciate some more plans to keep things moving along. I intend to get an engine the last part of Jan. 85 or Feb. You mentioned earlier you were going to see about picking up some engines. Have you been able to locate any? (ans. no)

Lucie and I are very pleased with the way our Cozy is developing. We think you did a tremendous job designing the Cozy. I was very impressed with the performance of your Cozy in the CAFE 400. This just reinforced our belief that we made an excellent choice selecting the Cozy. Do you have the Airplane Manual finished? How much? I would like a copy as soon as possible.

Merle D. Musson (EAA143402)

Cozy Ser. No. 6

Al and Cathi Yarmey, Salt Lake City, sent us a video tape of their project. Fuselage is on the gear, canard done, and wings almost done. Their Cozy outgrew their apartment bedroom, so they moved

into a house owned by a local EAAer, with a large garage-shop. These people are really moving along. Al's twin brother (they both fly Lear jets for a living) is building a Long EZ (some people don't get the word). We should really get some interesting comparisons from twins Al and Bob, when their almost twin airplanes are finished.

We have several customers who are building both Cozys and Long EZs. We occasionally have customers who are switching from Longs to Cozys, and have Long EZ plans for sale. If you know of anyone who needs a set, send us the name and we will publish it.

Similarly, if you have any neat things for sale like 0-235s, let us hear from you and we will publish it.

Wm. Spreuer, 26391 Via Canon, Capistrano Beach, CA 92624 (phone 714-496-3430) would like to hear from other builders in his area.

One of our builders asked if we would issue him a second serial number so he could build two airplanes from one set of plans. We explained to him that the plans are copyrighted, and the license agreement specifically limits a builder to one airplane per set of plans. We arranged a compromise, however, in which we licensed him to build a second airplane from one set of plans for a reduced fee.

Another builder advised that he has extended the nose of his Cozy to compensate for the heavier engine he intends to install. We told him that this was a dangerous modification to make, because adding more fuselage area that far ahead of the c.g. is very destabilizing, and we wanted no part of it. He said he was a very experienced pilot and would conduct a comprehensive flight test program.

The reason we mention this is to make a point. Some of you will be tempted to make changes in the design of the plane you are building, such as a heavier engine, a longer nose, or whatever. You may consider these changes to be minor, or maybe even improvements. Please keep in mind that this puts you in the position of being both the designer and the manufacturer. It is hard to predict what effect such changes may have to performance and to safety factor. You will have the responsibility of conducting thorough tests. You should also accept the fact that your change may not provide the benefit you envision, but cause you problems down the road. We cannot recommend or even agree to any change that we have not first tested ourselves. We already consider the design to be optimized, and do not intend to test any modifications, except for the new Long EZ rudders.

DESIGN CHANGES

As soon as Section 1A and Newsletter #8 are in the mail, we intend to start work on building the new rudders now recommended for the Long EZ, so we can test them in the spring. If you can postpone building your rudders until after our tests, you may save doing them over. The new rudders are very desirable, if they do not have any adverse side effects, which is the reason we must test them first.

When we were in Wichita, we had a chance to discuss with both Mike Melvill and John Roncz the test work they are doing on alternate canard airfoils. To make a long story short, everything they have tested to date has had some adverse behavior that made it worse than the GU. I don't know how much more work they intend to do, because the benefits they seek to achieve, i.e. a little less drag and a

little less trim change in rain, seem so very marginal at best, and some of the experimental testing has put Mike in some downright dangerous situations. Will let you know what develops.

PLANS CHANGES

- Drawing A-3. The 1" dia. hole shown on the centerline for nose gear crank should be 3/4" dia. and located 1" right of center and up 1/4 to 3/8 ".
- Chap. 2, p.2, Misc: Add (2) drain valves, SAF-Air CAV 110 or Curtis CCA1550.
- Chap. 2, p. 2, Airframe Bolts: Increase (2)AN3-10A to (6)AN3-10A, Increase (2)AN3-15A to (4) AN3-15A.
- Chap. 2, p. 4, Chap. 11 Hardware: Add (4)AN3-10A and increase (2)AN3-15A to (4)AN3-15A.
- Chap. 2, p.5: In Chap. 21, p.6 you will need 2 drain valves for the gas tanks, per above change.
- Chap. 8, p. 1, Fig. 1: A builder has suggested changing top shoulder brace width from 3-7/8" to 4-1/4" and trim to fit.
- Chap. 8, p. 1, Fig. 2: Change 1" dimension for 1/4" plywood block location to 1-1/2".
- Chap. 10, p. 2, Fig. 10: Please add a note that when installing dowel rods, select locations which will miss the high density foam blocks installed later in locations shown on p.6, Fig.54.
- Chap.12, p. 1, Overview: CN1 should be CNL, also p. 2, 3rd par.
- Chap. 21, p. 5, Step 11: First sentence, change Chapter 15 to Chapter 23.
- Chap. 14, p. 4: Holes drilled through the engine mount extrusions for bolting to fuselage and centersection spar should be located 1/2 in. from outside surface of flange.

WEIGHTS

Jim Krug sent in these weights:

Fuselage, end Chap. 7 =64.4 lbs.

Center section spar, Chap. 14, Step 11 =28.75 lbs.

Two NG30s with holes drilled =2.46 lbs.

Send in the weights for various parts of your project and we will publish them too.

SUPPLIERS

In previous newsletters we have advised you to use only recommended materials which you have purchased from authorized distributors. There is a reason for this. Building an airplane is a little more important than building a boat or a dog house. You will appreciate this a little better when you are sitting alongside your loved one at 10,000 ft. in the airplane you have built with your own hands from all the right materials.

As you know, our practice has been to recommend the same suppliers who are used by other designers, in so far as possible, who are generally well established with proven track records.

Recently, however, we have been getting numerous inquiries about Alpha Plastics, a small and relatively new entry on the scene. It seems that a number of Cozy (and other) builders have been purchasing foam, glass cloth, and epoxy resin there. Some of them have been so pleased with the service that they have written to us asking us to recommend Alpha Plastics to other builders. We decided that we needed to learn more about Alpha Plastics and the materials they were supplying to our builders, so we called owner-president Ira Hale, and arranged a visit there on January 5, 1985.

Alpha Plastics is located outside of West, Texas, in a hangar on a private grass strip close to the Hales residence. It stocks all of the foams and glass cloth specified for use in construction of the Cozy (and other designs) and also Safe-T-Poxy II resin and hardner. Alpha Plastics stocks both the Hexcel and Burlington 7715 UND cloth. Although Burlington claims that its UND is equivalent to Hexcel, the Hexcel is definitely easier to work with on curved surfaces and it is the only one we recommend for the Cozy.

We found Ira (and his lovely wife Elizabeth) extremely anxious to provide quality service and materials to composite homebuilders, and also anxious to cooperate with designers to promote designs built from basic materials, so we are giving them our endorsement.

A catalog is available for \$1.00 from:

Alpha Plastics, Inc., P.O. Box 157, West, Texas, 76691 (817) 826-3639 or 826-4151

We are listing Alpha Plastics as an authorized distributor for foam, glass cloth and epoxy resin. You can read more about them in September 1984 Homebuilt Magazine.

We would like to call your attention to an excellent article about Wicks in January 1985 issue of Kitplanes. Wicks started business in 1906 as an organ company, and because of their reputation for quality materials, became involved in aircraft supply after WWII. They are a very reputable company and we are pleased to have them as one of our suppliers. We also rate Wicks very highly on service.