Make Your Own Wheel Pants

Robert & Valerie Harris (TN) - First make a full size drawing of the wheel pant profile on a piece of heavy paper. Transfer the profile to pieces of 2" foam. Cut out the area where the tire is located and then hot glue foam to the tire and strut. Take small pieces of foam and glue to the inside of the strut and brakes,

Park the Eze with the nose gear extended and the tension off the main gear. Next, draw a center line on the foam core parallel to the centerline of the fuselage. This will give you reference to help assure the pant is installed parallel to the airflow.

Now contour the foam to a pleasing desired shape. Make templates off the first wheel pant foam core to help make the second pant similar in shape. I have made several sets of pants this way so I don't use templates anymore. I use a yard stick and my eyeballs. Just cut and sand away everything that doesn't look like a wheel pant.

Glass the foam core with two plies of BID while it is still on the airplane. After cure, cut the pants off by making a vertical split 2" aft of the axle.

Next, install a 2024-T3 backing plate on the front half of the wheel pant. To this I rivet nutplates that are used to secure the aft half of the wheel pant. Reinforce the screw attachment points with hard wood blocks covered with 3 plies of BID.

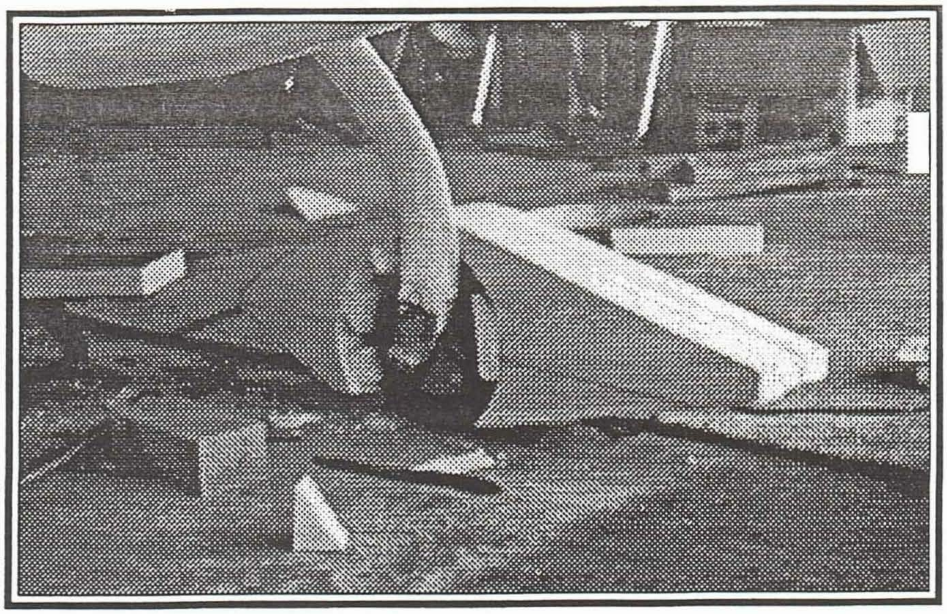
I leave most of the foam in the wheel pant halves. Remove foam three inches in front of the tire and also three inches aft of the tire. Allow three quarters of an inch clearance on top of the tire. Smooth the foam remaining inside the pant and glass with two plies of BID.

Before finishing the wheel pants I test fly them to check for alignment and vibration. I start off in the pattern to see how they handle normal touchdowns and then see how they do on a firm touchdown with max breaking. After the hard braking test, stop to check for heat build up. Remember to cut the vent holes in the top of the wheel pants before doing this test.

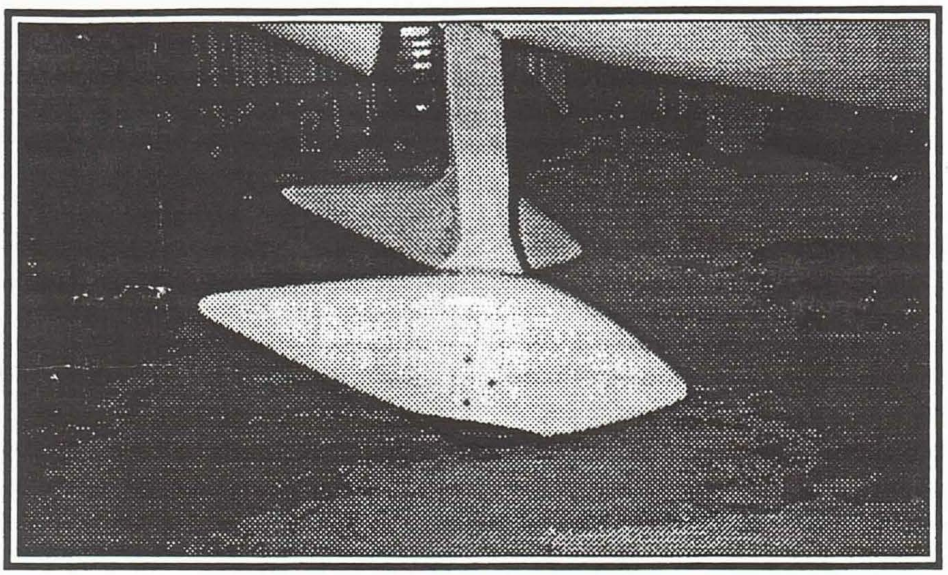
If no problems are evident after this test I, next, open the flight envelope out to red line. At 190 indicated I started to get some vibration. I returned to the hangar to determine the problem and discovered the right wheel pant toed in too much. After proper alignment the airplane went smoothly to red line with no further problem. Next, I removed the pants for finish and paint work.

The wheel pants really improved the looks of our Eze. In addition, we gained seven mph for our efforts.

The next project is to make baggage pods for our Eze. I know how to make them but would need a lathe to make the pod true. I wonder if there is anyone out there who has made a mold that I could borrow and not have to re-invent the wheel.



The fun part of designing wheel pants!



This shape produced a 7 mph speed gain.
What will your shape do?

The Basics of Brakes

Ann McMahon (LA) - Brakes on the Long-EZ are a very important but somewhat unpredictable system, which provides both steering and stopping. They are unpredictable since we cannot check them until we land and apply them. Certain maintenance problems can lead to erratic operation - fine one day, gone the next. A recent experience of loosing all the right side brake fluid, provided me an excuse to overhaul my entire brake system and learn all I could. As a novice and non-builder, I will probably never know as much as Gene Zabler, Herb Sanders and Vance Atkinson have forgotten, but you have to start somewhere.

You non-builders know many A&P's are unfamiliar with the Long-EZ and will not take responsibility for the airframe inspection unless you do. To take this responsibility, you have to learn about your aircraft. I hope this article helps.

Research took me to back issues of Central States Newsletters all the way to 1987, the Arnie Ash years (Central States founder) and my own set of Long-EZ plans. I also received valuable input from Gene Zabler, Miss Sandi at Cleveland Wheel and Brake and the Cleveland Brakes Maintenance Manual. Most importantly, I learned a great deal from slowly taking the systems apart on my own Long-EZ with the thoughtful and patient assistance of my husband, Rhett.

Preflight This is probably the most import check on the brake system since the first sign of trouble will usually reveal itself in a thorough exam of the wheels, brakes and connections. These are the items on my preflight list.

1. Check for dark residue on brake assembly that means slow leak.
2. Check for the obvious fast leak with fluid on the ground or parts.
3. Check tightness of line connection at brake assembly.
4. Check connection points of aluminum lines for fatigue cracks.
5. Check pad thickness.
6. If you have exposed portions of Nylaflow, make sure aluminum tape wrap is secure and covers all these areas to protect from UV.
7. As you taxi to the runway, concentrate on how the pedals feel. Are they firm or do they feel spongy and tend to travel a bit after full application? Do you have vibration?
8. At run-up, notice how the brakes hold Are they steady or do they creep?

Regular Maintenance - Check the lines throughout the aircraft annually. There is ongoing debate between aluminum lines versus Nylaflow lines. They both have their strengths and weaknesses. Aluminum lines are light and strong. However, they are *not* supple. I just saw a fatigue crack in front of a connection on an aluminum oil line in my hanger mates' Lancair that nearly cost him his engine. Nylaflow lines are supple and they are strong. As a knowledgeable friend said once, "you could hang yourself from the ceiling with them". However, they are susceptible to UV light and to becoming brittle. So they must be replaced at intervals. Best consensus seems to be 5 to 7 years interval. If you are doing regular and thorough maintenance checks, this should come as no surprise.

Overhaul those master cylinders and wheel cylinders approximately every 2 years. Your overhaul schedule may be different. Cleveland can provide exploded views to aid cylinder reassembly and identify parts.

Master cylinders collect dirt. They do this because the piston in the master cylinder travels only a short portion of the available stroke - just far enough to expand the caliper and then return it to its relaxed position. Dirt accumulates in that unused part that never sees the piston. Therefore, never pump up the system by depressing the master cylinder its full length or until it bottoms. If you do, you pull this dirt and grit up in the cylinders damaging primary cups and/or O-rings and causing complete failure of the master cylinder!

O-rings have to be replaced anytime the assemblies are taken apart because brake fluid makes the O-rings swell. After removal, they do not fit properly and need to be replaced. Cleaning is also important as you can not detect leaks with a dirty assembly. If you have Cleveland brakes, you will have to remove the wheel cylinder's piston to replace the O-ring. This can be done by holding a hand tire pump to the line connection and gently applying pressure. The piston will pop out.

Failures can seem unpredictable in how they occur. The brakes can work fine at one temperature and then dump all fluid when it gets cold, for example. Note the position of the clevis rod on the piston rod *before* you take the master cylinder apart. This is your brake/rudder adjustment on the Long-EZ (more on this later). It would also be helpful to check the rudder deflection before you start this process.

Replace hardware at line connection points to brakes and master cylinders approximately every 2 years. Remember, your own schedule may vary. My experience is with for Nylaflow line hardware. Replacement parts are not standard to certified aircraft maintenance and unique to the homebuilt arena. This consists of a 3 part, brass fitting which can be purchased at your local automotive or hardware store. Included is a sleeve with a flanged end that fits inside the last half inch of tubing at the wheel end, a short barrel shaped sleeve that fits over the outside of the line and a nut that fits over both. The barrel sleeve and the nut both slide to the end of the tubing where it connects. The nut is then slowly tightened over the barrel sleeve, crushing the barrel sleeve over the tubing and inner sleeve connection to make a leakproof fitting.

Replace brake pads as needed or anytime there has been fluid leak. Brake fluid destroys the integrity of brake pads. They disintegrate. My experience has been that original equipment manufacture's pads work the best. Make sure to order extra

rivets. Purchase the proper tool to remove and replace the brake pad rivets.. I have the threaded driver and it works just great.

Once the system is back together, you will need to condition the new pads to achieve max surface life. For Cleveland's, this means taxing the aircraft at 1700 rpm for 1500 feet with both brakes applied to keep the plane running at 5 to 10 mph. Allow the brakes to cool for 10 to 15 minutes and then see if they hold the full run-up rpm. If not, repeat the above procedure.

Replace the fluid in the brake lines with every overhaul. The correct way to do this is to push the fluid via an apparatus attached externally to the bleeder valve on the wheel cylinder or caliper. If you do not have a specific air tool for this, a hand operated oil can with a piece of tubing on the end of its snout works just fine. If you have nothing, you can pump the brake pedal by hand, using lots of short strokes to avoid bottoming out the piston discussed earlier.

Make sure your aircraft is parked with the nose gear fully extended before you start this procedure or you will probably not eliminate all the air bubbles from the system nor fill the brake master cylinders fully. The master cylinders must be at the high point of the system to get all the air out of the lines. This really takes two people if your master cylinders are mounted in the front, as mine are. One person needs to make sure all air bubbles are out of the lines while the other pumps fluid at the wheels. Aviation brake fluid still seems to be the best. Keep in mind it is flammable and there have been brake fires started with the combination of a leak and hot brakes.

Adjust the clevis rod on the cylinder piston rod, if needed. This adjustment affects both the brake pedal portion of travel of the rudder pedals and the rudder deflection itself. Start at the point your marked on the rod before taking apart the master cylinders. My Long-EZ's rudder pedals traveled too far before engaging the brakes. In screwing the clevis rod up or down on the threaded portion of the master cylinder piston rod, a position was found that provided firm braking with more than the minimal rudder deflection. Make sure you know where the threads stop at the top of the rod because you can not see them when the clevis rod is in place. Also remember, as the brake pads wear down, the rudders will deflect more.

In the original plans, Burt Rutan calls for a 30-degree deflection of the original rudders. I have the big rudder mods on my Long, that call for 23-degrees to 28-degree deflection. Some Long drivers, however, prefer to crank in a lot more. Be careful you do not adjust the rudder pedal travel so short that the brakes lock before you get the deployment of rudder you need on a very windy day. You will have to do taxi runs to check this.

Additional Information is available. Get the Cleveland Maintenance Manual and sign up for their periodic product updates. You can reach Sandi at 440-937-1261. They will answer the phone "Parker-Hannifin" because Parker owns Cleveland. Sandi can also provide exploded, labeled views of the assemblies.

Jeppesen provides excellent basic maintenance instruction books on wheels and brakes. You can buy these from most of the Long-EZ construction supply sources. There are also maintenance videos available from the same place and there is an especially large selection in the Sporty's catalog.

This Central States newsletter has a wealth of information if you dig. If you don't like digging, contact David Orr at 714-852-7230. He can generate computer printouts of articles on any topic you request for a nickel a page (last check).

Finally, talk to as many Long-EZ drivers as you can and take time to learn your own airplane.

Here's to safe flying.

ANR Headset Conversion Kit

Jim Madsen - (MI) During years of enjoying my Long-EZ I have had one complaint **NOISE!** With only a 100 hp engine, I tend to run at high power settings. As a result, my ears would ring for as much as a day after a flight.

Every summer at OSH I would lust after a set of Bose dynamic noise canceling headsets, but the price tag never fit into my budget.

I recently purchased a $169 ANR kit to convert my David Clark's to something resembling the high priced Bose from Headsets, Inc 2320 Lakeview Drive, Amarillo, TX 79109, Phone 806-358-6336, FAX 358-6449, e-mail: anrsets@aol.com. For an extra $50 they offered to install, but since I built the airplane I figured I could rewire something as simple as a headset.

Instructions claim any competent electronics technician should be able to install it in less than 2 hours. The disclaimer about requiring "reasonable skill in the use of a soldering tool & a minimal understanding of electronics" is nothing more than the typical legal boilerplate. Well folks they made their point. It took me an entire evening to install the kit. The instructions were easy to understand but this is not the time to learn fine wire and circuit board solder skills. I felt fortunate I did not messed it up.

Instructions strongly recommend the use of gel type ear seals, $18 from Aircraft Spruce. The gel seals are more comfortable on long trips. The dynamic noise canceling function is powered by a standard 9V battery with supposed life of 20 hours. My first battery lasted over 15 hours, until I accidentally left it on.

The headset works great! I can't tell how many decibels of noise reduction I experience, but it is significant, especially in the low frequencies. I no longer have any ringing in my ears, including a recent trip with a couple 4 hour legs. I highly recommend noise canceling headsets to all my flying friends and the ANR kits to those who can not afford the high priced spread.

Wheel Pant Mounting Idea

Dave Dent - (CA) I have been working with NASA and Rutan's Scaled Composites dealing with Remote Piloted Aircraft for several years. During the testing of the Raptor demonstrator remote piloted vehicle for NASA's aeronautics division, a set of low drag wheel pants were designed by Cory Bird, one of Scaled's engineers. Cory is one of the best when it comes to low drag with most anything. He built the wing for the famous "Nemesis" formula one aircraft.

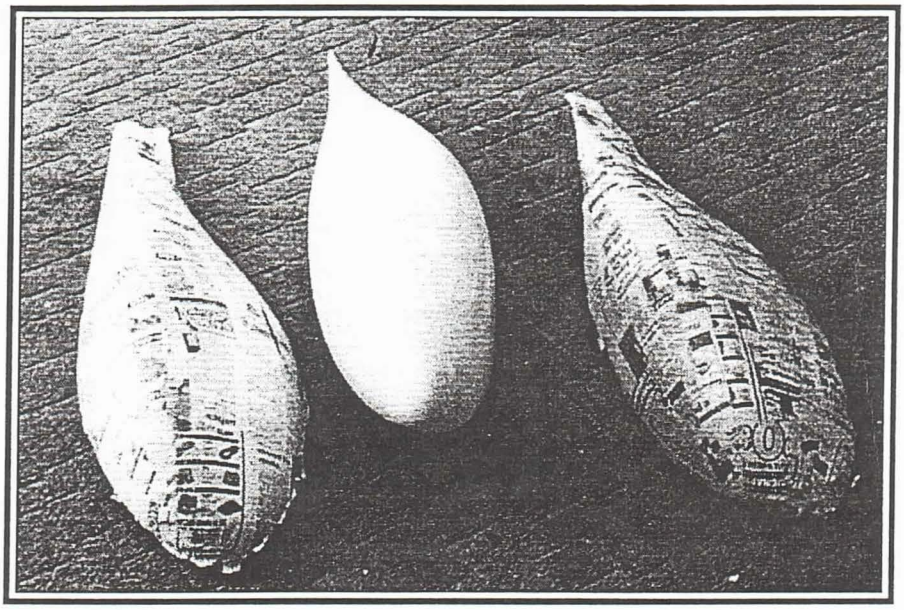
Cory loaned me the plugs and John Meyer and I built molds. In a few weeks we had a real good set of molds for some very low drag wheel pants.

I made the pants out of carbon and West system materials. It turned out to be a perfect combination. They were hand laid by wetting them out while in the sun. They came out like they were vacuum bagged. The parts weighed in at 1.5 pounds each with a left and right set. They are a little long for the EZ but the proper placement on the gear overcomes most of this problem. If I were to make another set I would shorten them a little.

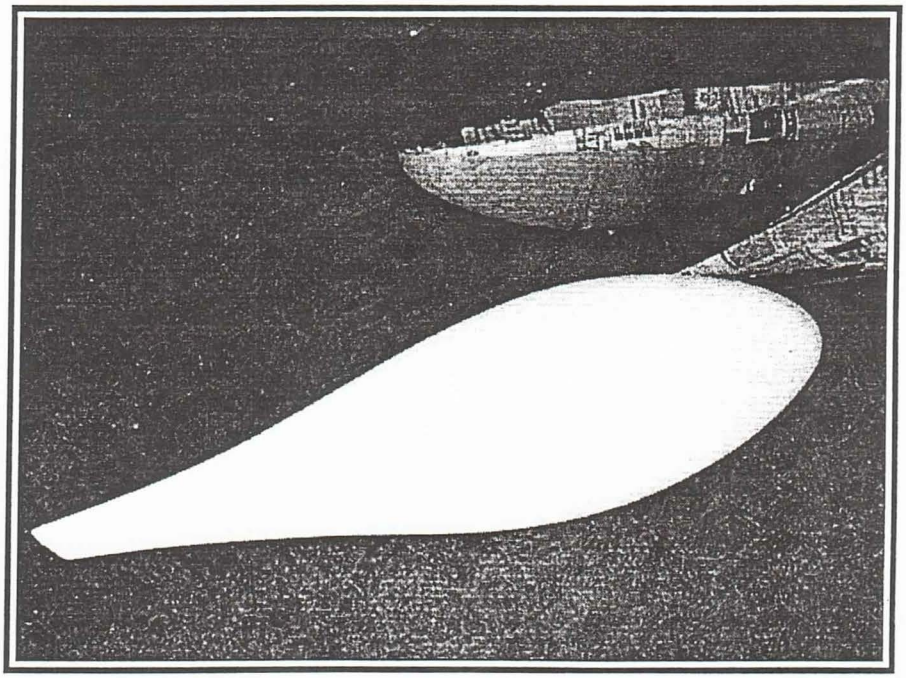
Next came the hard part, locating holes and fitting the pants to the gear strut. I didn't want to cut up good parts to find the proper mounting location. My wife, Carol, came up with the fantastic idea of making a set of pants of paper mache to determine mounting location. There would be no loss of anything but some newspaper and liquid starch. It worked perfectly. I was able to cut and paste to my heart's content and develop the perfect fit and pattern I needed before cutting the real thing.

If you ever have to make a first and are not sure of the fit try this method. This idea may not be new to others but it was to me. The performance of the pants proved to be very good, in fact, super good. I am not quoting any speed increases but they are better than what I had before.

During construction I avoided pin holes by the following method. Before laying up glass in the mold I sprayed some kind of primer over the mold release and let it dry. Next lay up ¼ oz deck cloth. Then, while still wet, put two plies of glass on. After cure, in the mold, you will find there are no or very few pinholes in your part. I use a cheap spray can of primer from the hardware store. I wish the vendors of my prefab parts had taken just ten more minutes to do this. It would have prevented the hours of extra work to fill the pin holes and eliminate the extra weight of the filler. This system works great and is a solution to a long time problem. You will find this makes finish work much easier, faster and lighter.



Paper pants solve a building problem



For Sale

6" prop extension, SAE #1, with crush plate - $100

Hershey Kiss prop spinner - $60.

Contact: Ron Verderame
702-395-8315
VADER@POWERNET.NET

Propeller Testing Notes

Carl R. Denk (OH) - I have been flight testing propellers for Sensenich Wood Propeller Co. The following propellers are not necessarily the best performers for the situations, but the data was selected to illustrate a particular issue. I will draw conclusions from the data. I have heard that one particular propeller is a good or poor performer. This article will provide a standardized data collection method, covering most variables. Data collection is not as easy as one might think; issues and a few solutions follow:

1: Probably stable air is the most important item. My local terrain is flat, but surface color, i.e. a plowed or green field, parking lot or town causes thermals of more than 500 feet per minute. This will create a wide spread of climb data. In level flight speed data, when trying to maintain altitude, the airspeed can easily vary 10 knots. I ended up flying over Lake Erie for smooth air, but even there vertical air currents are possible if too near land.

2: I reduced climb data to something readily understood, but accurate enough to yield meaningful results and entered it in a MS Excel spreadsheet. After experimenting with various formulas, I settled on a straight line curve, which Excel fit to the data. Using data from 3000' to 8000' pressure altitude. Then 4 data points (only one for any one propeller) out of 54 data points were assumed faulty, and adjusted to make the curve fit better. The equation for each propeller's curve (straight line) was then used to calculate the rate of climb at 5000'. This is the key comparison number.

3: All testing used pressure altitude.

4: Aircraft fuel load and weight and balance was maintained closely.

5: Temperature: Most tests were with ground temperatures near freezing. I tested one propeller at warmer temperatures and will discuss it later. I have made no temperature adjustments to data.

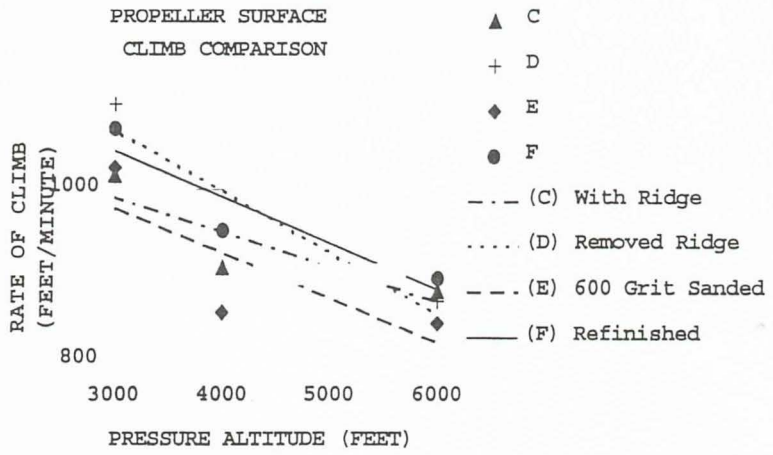
6: Humidity: No relative humidity correction was made.

7: Engine power output: The true indicator of propeller performance, is the ability to convert a given power output to speed and correctly dividing the speed by horsepower. This would be the ultimate comparison of propeller design and a better predictor of propeller performance at different power settings and altitudes. Designers are very interested in this factor, but I haven't touched it yet.

8: All fixed pitch propellers are compromises between takeoff distance, climb and cruise. There are propellers that give excellent cruise performance at certain altitudes. Cruise RPM, cruise power, cruise altitude, altitude of usual airport need to determined before the prop design can be completed.

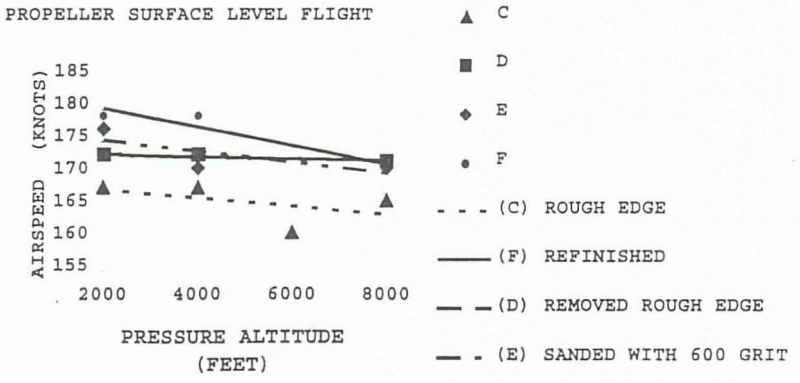
9: Pitch designation only has meaning within one manufacturer/family of propellers. Different manufacturers measure pitch at various distances from the center, on the flat or curved face, with or without a template and with airfoil differences.

Effect Of Propeller Surface Roughness: One propeller was intentionally finished with the urethane leading edge masked, while a urethane clear finish was applied to the prop. A rough ridge resulted on both sides of the leading edge where the flowing air had to step up. The 2nd flight was made with the ridge block sanded off back an inch with 600 grit. The 3rd flight had the entire blade area was roughened with 600 grit. The 4th flight was made with the entire prop refinished with Deltron, sanded with 1500 grit and buffed to a high gloss.



The above graph shows the stepped rough leading edge increased ROC (Rate of Climb) by 33 FPM. After sanding the whole blade with 600 grit paper, 60 FPM was lost. Finishing the prop to a high gloss, gained 70 FPM. The refinished prop produced about 5 knots extra at all altitudes. One may conclude a prop should be kept in high gloss condition for best performance.

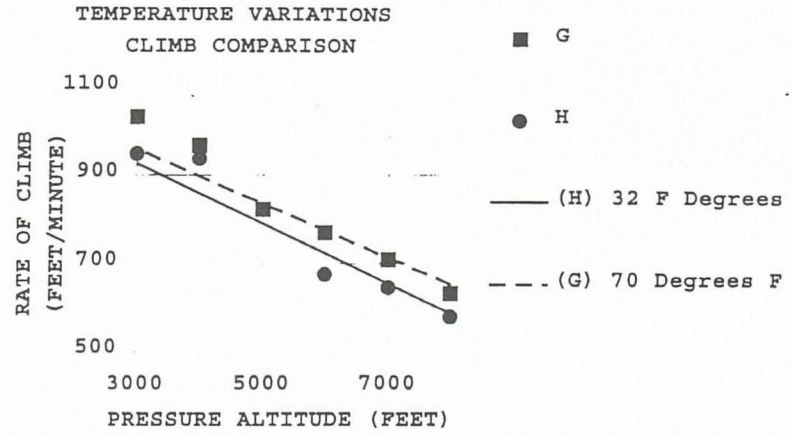
Cruise: The following chart is for the same props and displays the effects of surface roughness in cruise. All cruise data are with IO-320, 160 Hp., 2700 RPM or 25.5" Manifold Pressure, which ever is a lower power setting. The same trends are shown in cruise as in climb.

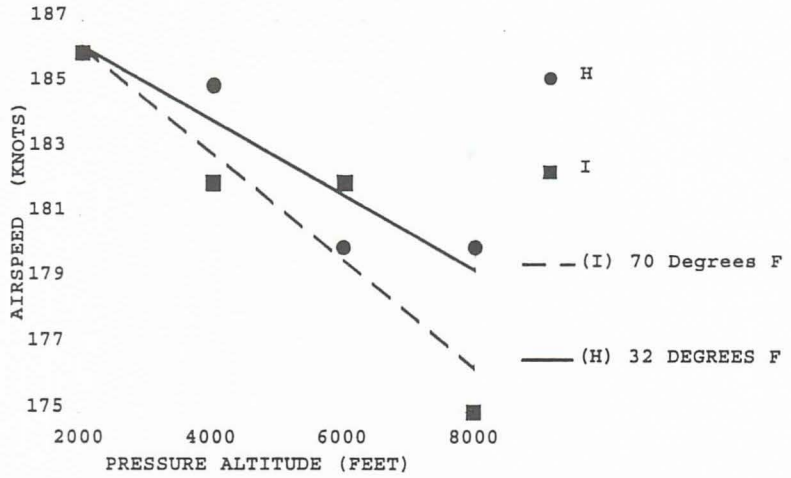


Temperature Effects: I haven't conducted much testing at different temperatures. I was able to test one prop at ground starting temperatures of 32 and 70° F. The adjacent chart shows a 42° F rise in temperature resulted in 54 FPM decrease in ROC. I think the rule of thumb could be 1 FPM decrease for 1° F increase, or the same ROC will occur 1000' lower for 40° F temperature rise.

As you can see, the level flight data points don't appear to be very good, but they show the issues involved. Possibly there was a thermal at lower altitudes that allowed the airspeed to be higher, while maintaining altitude.

In the next newsletter, I'll compare the various props in climb and cruise configuration at various power settings. I have a conventional wood .3" lamination prop, and a composite prop now, with another conventional prop coming this week. This has been quite a learning experience.



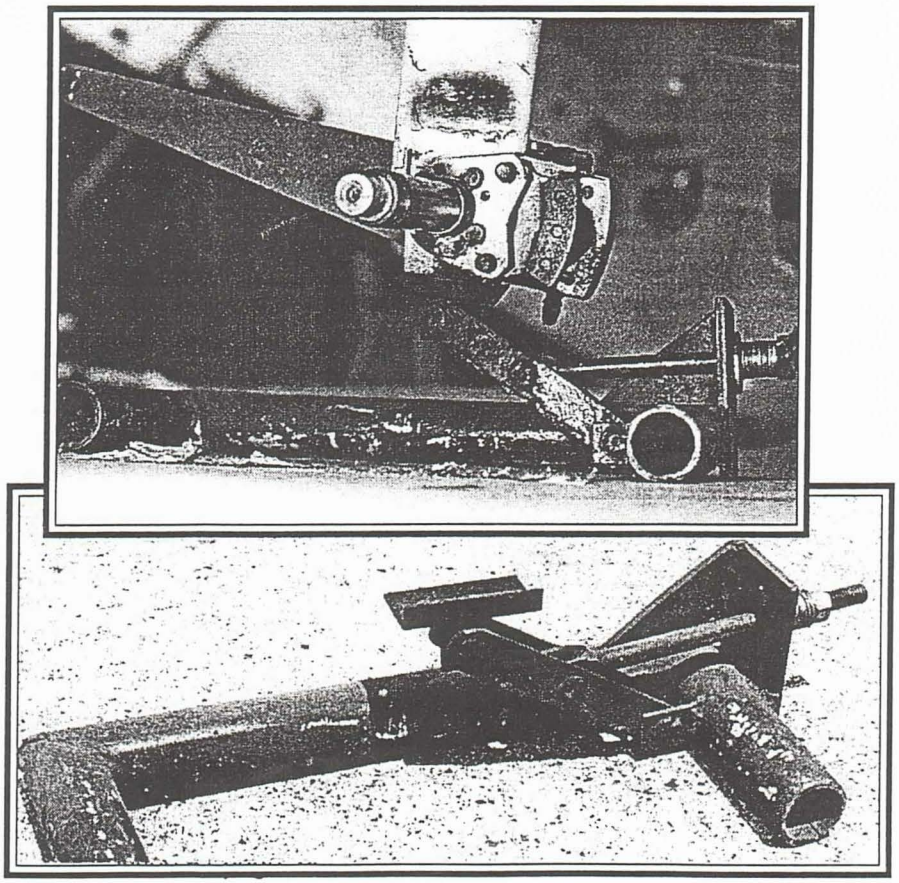


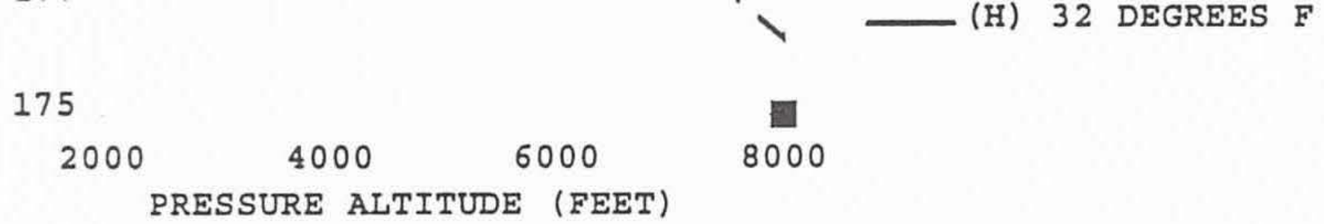
Jack em Up

Sooner or later, one has to jack his airplane up to perform maintenance. Many methods will work and several have been published in this newsletter over the years. I have tried them all but have been unhappy with the lack of security I've felt while the airplane was off the ground or have found the hardware to be difficult to store in a limited area.

The jack I made is cheap and, being the size of a shoe box, takes little space. The frame is made of 1-1/4" water pipe while the remaining is fabricated of scrap steel pieced together. A length of all thread rod makes up the tensioning member and can be adjusted by adding washers to get the lifting range needed.

The lifting pad on top should move freely to match the angle of the main gear strut. Be sure the pad does not hit the brake disc or you will not be able to rotate the wheel when the strut is jacked up. The frame opening should be big enough to clear the tire when it is on the ground but other dimensions are not important.





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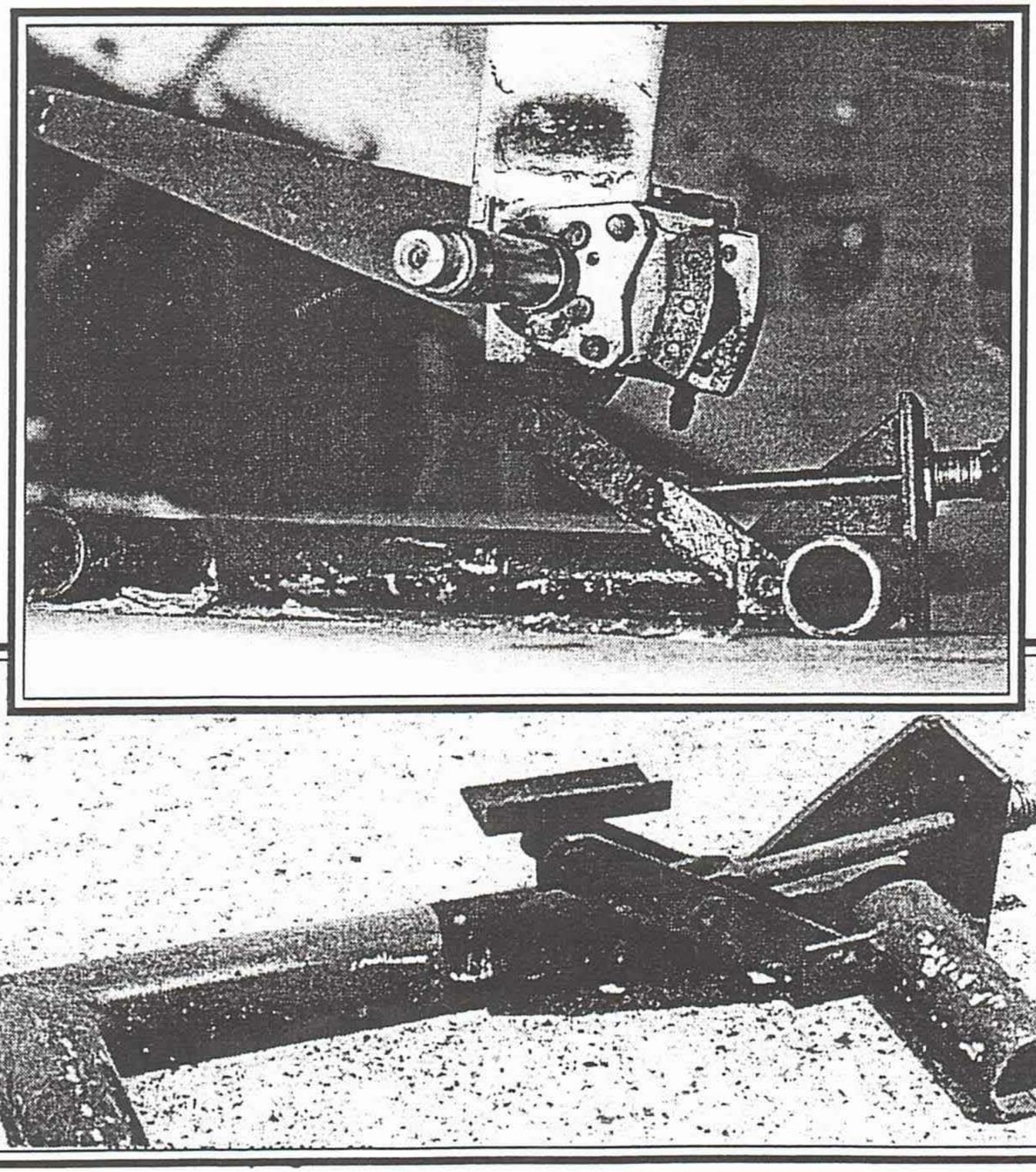


Whoa There!

Ed: Over the years, brakes have been an ongoing discussion subject. Some folks feel their brakes are adequate and some do not. Some folks never have a gear strut over heating problem while others do. What makes the difference?

Our brake systems convert kinetic energy to heat energy. Once the brake system is "full of heat energy" it can absorb no more and brake action will fade to near nothing. Brake effectiveness will return after the brake system has dissipated the heat. If our brake system is inadequately sized for our aircraft and technique, we may lose brake effectiveness and directional control. If our system is too large, we carry more weight than needed and increase the risk of overheating the resin in the main gear strut. This softens the strut and may cause it to "fold up". It is difficult to move when the wheel's axle is perpendicular to the runway.

Sandi Schickel of Cleveland Aircraft Wheel and Brake Division, 800-272-5464 (1-800-BRAKING) <techhelp@parker.com>, gave me the FAR Part 23 formula for determining kinetic brake energy requirements for an airplane. KE = .0443 x W x V x V / N. KE = kinetic energy per wheel-brake assembly (ft-lbs), W = design landing weight (lbs), V = aircraft speed in knots, N = number of wheels with brakes. Assuming your brake system is in good condition and deceleration rate is limited to 10 ft/sec/sec the formula will indicate kinetic energy requirements for your airplane.

My O-235 Long-EZ weighs 825 pounds, lands at 60 knots and at the 1350 lb. gross weight generates a 107,649 ft lb. kinetic energy requirement. This is within the capability of the 117,500 ft lbs brakes specified in the plans. I have had only one case of nearly complete brake fade in 500+ hours. It occurred during a 65 knot rejected take off at 1425 pound gross weight and after a protracted cross wind taxi requiring brake action to hold the taxi way center line. The aborted take off alone required over 133,300 ft lbs of kinetic energy to be dissipated. The brake system could not absorb all that energy and faded to near nothing, an exciting time! Fortunately, the runway was long and I stopped before the end, in Watson Lake, British Columbia.

Most Long-EZs and Cozys weigh considerably more than 825 pounds. A 925 lb. EZ, at the above load conditions, generates 142,700 ft lb. of kinetic energy, a 1025 lb. one generates 152,000 ft lbs and an 1125 lb. one generates 163,700 ft lbs, all considerably beyond the original 117,500 ft lb. brakes. Extra weight makes a difference but we frequently do not do much about that if fuel/passenger/baggage demands. Within limits, we can control touch down speed, however.

An EZ landing at 1425 lbs at 60 kts generates 113,639 ft lbs energy. A 5 kt increase raises the level to 133,000 while a 70 kt touch down requires 154,600. I have seen a few hot dog pilots do 80 kt touchdowns and try to make the turnoff. That requires over 202,00 ft lbs of kinetic energy dissipation. **Speed makes a tremendous difference in energy requirements!** Touch down at minimum speed with minimum thrust!

Cleveland brakes are available in several kinetic energy ratings. The common ones appropriate to EZ type aircraft are; 117,500 ft lb. model # 199-102 or 199-103, 155,000 ft lb. (sometimes called heavy duty) model # 199-156 or the 192,000 ft lb. (sometimes called super heavy duty) model # 199-152 or 199-152A. If you want to melt the main gear strut and flatten your tires, try the 199-197 model rated at 289,000 ft lbs. Cleveland rates their brakes with standard 500 x 5 tires and have no data for Lamb size. They go for a deceleration rate of 10' per sec/sec.

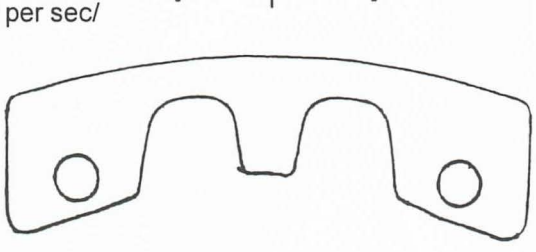
I am sure there are other differences, but essentially the 117,500 system can be upgraded to the 155,000 capacity by changing to 3/8" thick brake discs (3.5 lb. total weight increase for the airplane) and adding a spacer to allow for the increased disc thickness. Kit #199-93A (list price $298) will do it or buy the replacement discs and saw your own 3/16" thick spacer for about a third of that. See spacer drawing below.

Upgrading to the 192,000 system requires different calipers with a larger piston. The smaller system pistons are 1.5" in diameter and the larger is about 2" diameter. 3/8" Disc # 164-99 is still used while the new caliper is # 30-133.

If you don't want to spend the extra money, carry the extra weight and risk overheating the strut, just reduce energy requirements. Land at minimum speed, decelerate slowly, use maximum aerodynamic braking (rudders and landing brake deployed and roll long), set engine idle speed at minimum (there is considerable thrust at 1000 RPM. Consider installing electronic ignition as it allows significant reduction below mag ignition idle speeds.) and increase brake disc cooling (see CSA April 99 p 32).

Reduce taxi related heat that robs brake system capacity. Do not taxi while dragging the brakes. Taxi on the side of a crowned taxiway to reduce braking needed to compensate for cross wind. Have the nose wheel shimmy damper set correctly so that excessive brake application is not required to steer.

Of course, if all else fails, just raise the nose gear. It is an effective emergency brake. Just ask any of us who have "tested" that technique. Caution - do not stick your hand in the resultant spinning crank.



pattern for 3/16" spacer

Check for Loose Landing Gear

Al Hodges *(CA)* - May I suggest that you look at http://www.ez.org/gear_repair.htm and photo report. Fortunately, this is an accident that did not happen.

This repair and notice of the problem prompted me to double check my gear, which resulted in the EZ, one-person, "rocking" check for loose gear noise I wrote up below.

One person check for loose Long-EZ landing gear. If found loose, a second person helps to tighten the nut(s).

Recently, I noticed a creaking sound when I lifted or lowered the nose of the Long-EZ. I checked with other EZ pilots after wondering if the gear could be loose, causing the sound.

Chuck Busch suggested holding the brakes from the pilot's seat and have several guys rock the plane while another examines inside the hell hole for movement. Several guys were not available, but Ed Sammons, heard sound when rocking the plane, then tried to examine the gear mount without someone pushing the plane. He had no success.

When I shifted my body in the pilot's seat, I heard the creaking. Naturally, I moved some more and started rocking the plane while sitting in the pilot's seat holding the brakes. It worked well!

An occasional good rocking by the pilot may cause the sound, indicating a problem. Then, look for help. This EZ has over 1,000 hours in 17 years.

Ed saw movement, and the problem was "easily" fixed within the next few hours!

We learned why the term "hell hole" is used, but the devil is quiet, for the present.

Builder Tips

Vance Atkinson (TX) - For you folks getting ready to put on your wheel pants here is some advice. Mine are 12 years old and are the original Herb Sanders type (teardrop and very efficient) and are tightly fitted around the wheel. That is crux of the problem. I have about one finger width all around the tire, and when the COZY is eating grass or, parked on its nose, you can slide a piece of cardboard between the pant and the dirt. Pretty close. This was the arrangement years ago when every knot counted. Now I'm not so sure it's worth it. In 12 years, I have trashed one or the other with runway debris 3 times. The last was on the way to Sun-n-Fun while landing at Destin, FL. Fortunately, I was able to duct tape it together (it usually trashes only the bottom two inches or so) to see me through the week"s flying that lay ahead.

What happens is that the tire is spun up, and if a small rock or branch of a tree or shrub gets run over, its likely to get spun up into the small clearances around the tire. OR, if you let the air pressure get low, the side walls will bulge (at impact) and do damage, or if you do an astronaut shuttle landing the tire really goes flat for a second, the sidewalls will bulge even more causing bigger damage. I haven't done any trials on how much airspeed is lost by raising the pant and giving more clearance. But I suspect not much more than a knot or two. So if you're a low rider like me, be prepared to do a little repair during your cruising.

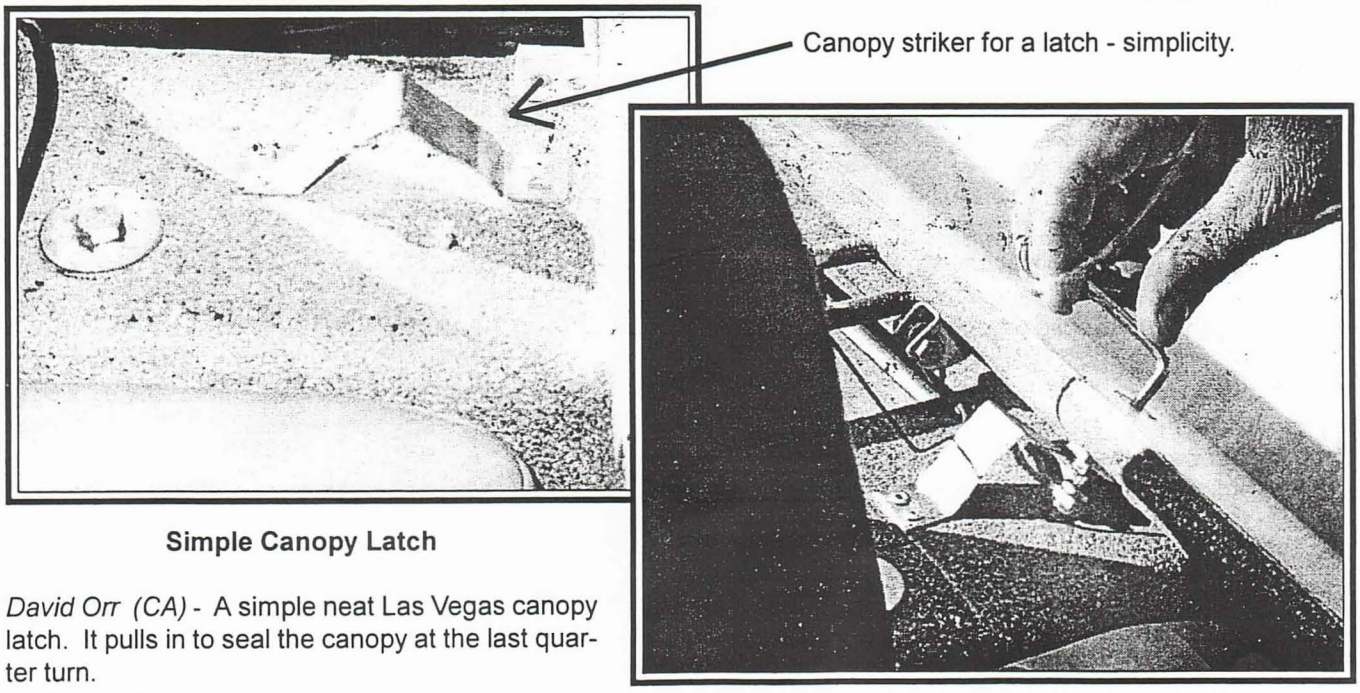
Some of the builders have asked me why my wheel pants are split into front and back instead of the newer installation with the support all coming from a semi circle on the inside like most are doing now. Both my hangar partners (COZY 3 and a COZY 4) have this later mod and is much easier to take on and off. The total work to mount these is about the same, so the savings are in the field when you have to repair a tire or tube. Incidentally, after buying the shells it takes about 40 hours of work to build, align, install, finish, and paint these beauties. But worth every knot.

On a different subject, I've noticed several of my sight gauges in various projects and some builders put a wee bit too much flox on the surfaces of the plastic when putting the two together. Some brown ugly flox squashes into the clear bubble sight area. To fix this, you can pop the bubble off and put a new one on with minimum work. I'll send you a new bubble for 8 bucks including postage. You are going to be looking at that sight gauge for a long time so it should look good.

To that end, I've had a builder use 5-minute epoxy when bonding the two pieces of plastic together and another builder used Gougeon Brothers epoxy or West system as some call it, with successful results. Several years ago, when I first started making these jewels, I glued up samples with safetypoxy and RAE. I have just now glued up two more with 5 min and West systems. It looks good so far, and eliminates the brown stain from oozing into the clear tube. More later.

Previously, I reported on a homebuilt fuel flow system designed by a Defiant builder. It is a kit you build for $335 which includes a Floscan transducer. This is a small lightweight unit, which digitally reads out in total gallons used, and current fuel flow. Sadly, this unit did not work out for me as the ambient light is too much for the unit making it impossible to read in direct sunlight and even when using a shaded hand over the display, barely readable. The unit was not very accurate in a steady state fuel flow situation, as it would vary the read out by 3 and 4 tenths of a gallon. I have written the designer but have not heard back from him yet. The kit is by Talon Works Inc. in Fayetteville Ark.

Have fun flying. Cozy N43CZ, 1200TT



Simple Canopy Latch

David Orr (CA) - A simple neat Las Vegas canopy latch. It pulls in to seal the canopy at the last quarter turn.

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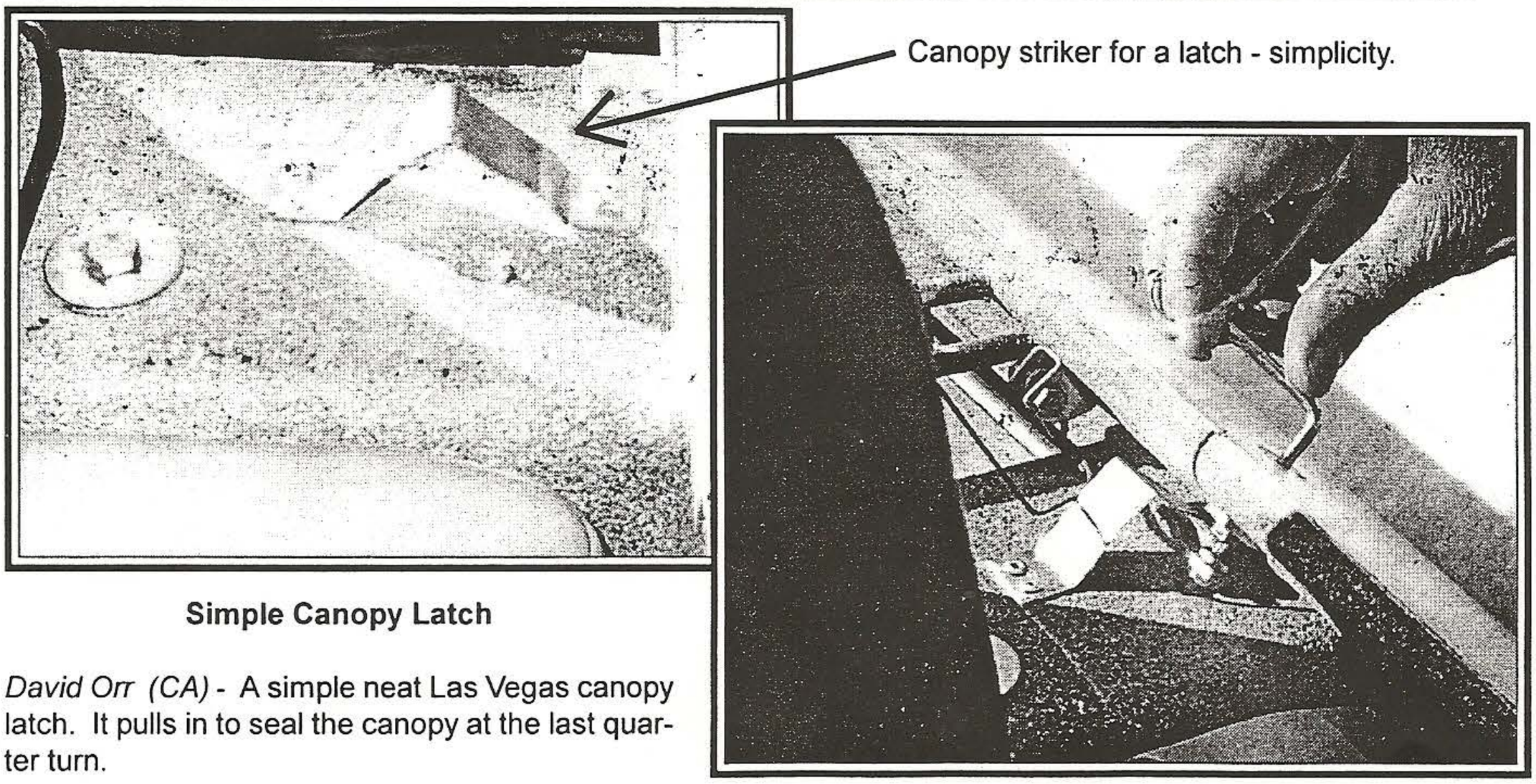

Simple Canopy Latch

David Orr (CA) - A simple neat Las Vegas canopy latch. It pulls in to seal the canopy at the last quarter turn.

Flat Tire Problems?

Carl Denk (OH) - Check the inner tube for failure, There is a butt joint, where a tubular (round hollow) piece is glued together. The joint should be slightly heavier in wall thickness. The joint is in a plane through the center of the axle. If that joint fails, you would wrongly assume it is a blowout, since the failure will be sudden without warning, and resulting in total deflation instantly.

The other common types of tube failures are:

1: Fold, chaffing failure. Since tubes stretch when inflated and in service, they should not be reused. When installing both the tube and inside of the tire must be coated with talc to promote sliding. The tire should be inflated to say at least 20 psi., totally deflated to allow the tube to normalize its shape/position, and then inflated to the recommended pressure. This procedure applies to all tube type tires including 1.25x27 bicycle tires. This could be slow, gradually increasing loss of air, or fairly rapid. Anytime one tire on a vehicle loses more air than the others, it is suspect, and must be corrected by repair, not just filling.

2: Rim cut, resulting from low air pressure and hitting a bump, collapsing the tire. The tube gets pinched between the folded tire side wall and the wheel rim. This cut is parallel to the circumference of the wheel. Usually fast loss of air, but could be slow if the cut was slight or a bruise.

3: Valve stem area - Usually when the stem is not centered in the wheel hole. Can also be where stem is not located properly relative to the wheel hole (some are on the centerline of the wheel, and others to one side). Garden tractor and wheelbarrow applications are good for this. It usually is a slow leak, but can be rapid.

A tire failure would be a blow out, with torn, not worn rubber and fabric; not common unless worn to the point of reduction of the fabric (textile or fiberglass or steel), and tensile strength is exceeded. More common reasons to replace a tire are balance, uneven wear, and just worn beyond life.

EZ Project for Sale

Standard Long-EZ on gear, Cleveland W & B, GU canard and elevators, wings, winglets & ailerons ready for fill. I have foam and glass enough to finish. Tinted canopy but not installed - strakes not done, engine mount (O-235) , some instruments, Lycoming O-360-A3A also available or will sell separately. Asking $5,000 plus $4,000/engine.

Scott Allen
471 Rd W D South
Ogallala, NE 69153
308-284-8465 W, 308-284-3494 H

April Issue Comments

Jesse Huerta (FL) - As always, I thoroughly enjoyed the April newsletter and all the great, useful information you manage to pack into it. It's always helpful.

I was somewhat distressed however, with the incongruity of the two main stories in the issue. On one hand, we all mourn the tragic loss of Gus Sabo in a weather related accident. On the other, we seem to glorify the seemingly senseless risks taken by H G Schmidt in his "great adventure". I'm disappointed that we seem to be talking out of both sides of our mouth. To detail a story of someone who flew " as low as 50 feet in heavy rain with visibility often a mile or less" can only encourage some other adventure seeker to try the same thing, possibly with the same tragic results Gus endured.

At best, running the two articles in the same newsletter was a case of poor judgment. Let's stop encouraging reckless behavior. Thanks

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Seat Cushion Support

Ted Weitz (SC) - I just finished my extremely comfortable new Temperfoam seats with thigh and lumbar support. I think every EZ builder should give Temperfoam a serious thought, mainly for its impact absorbing characteristics. It can make a big difference in case of impact.

The lumbar support is easily done by placing a 2.5" strip of the high density Temperfoam at the lumbar region and try it out, making modifications, until it feels right. An alternate method is to trace your lumbar convexity shadow and then file styrofoam to a matching shape and place it behind the foam cushion. This will keep the convexity of your back and will reduce fatigue on long flights.

Harris Cozy Mods

Robert Harris (TN) - The Cozy w
purchased has a Vari-Eze Lamb tir
on the nose wheel. It handles muc
better on the ground and gives
smoother ride than the stock tire.

The strakes are a cross betwee
Long-EZ and Cozy. They go farthe
forward giving more shoulder room

I am presently testing a ground ad
"stable Ivo prop for our Long-EZ
.ctory support has been good an
they are now making larger diamete
blades to improve performance
Prop workmanship is very good.

Epolite 2427 Scum

Wayne Phillips (VA) - After switching from Safety Poxy II to the MDA free stuff, Epolite 2427, I discovered a scum forming on the hardner surface. Warming the hardener did not help. Fortunately the good folks at Wicks sent me a replacement can.

Instructions on the can indicate hardner draws moisture from the atmosphere. The solution is BURP. Hexcell BURP 8440, an air displacement spray. Spray 2-3 seconds of this into the ratio pump's hardner bucket once the hardner is added and immediately put the lid on. Do this to the open hardener can too as it is no longer full. You could also use nitrogen if it is handy. BURP can be had at: Chembar, P.O.Box 386, Groveport, Ohio 43125, (800) 327-9504. A spray can costs about $20.45 inc. shipping.

Editor: If you live in a less humid area you may not need this procedure.

Electric Nose Lift Update

Tom Ellis (IN) - The electric nose lift mechanism description as printed in the July 95 news letter has had a failure - since corrected - and the slider mechanism needs to be stronger. I have made up new parts and will send a set to Vance Atkinson for testing. I will update the plans.

I recommend that builders **NOT** use the old drawings as shown in July 95 p 31 but wait for the revised plans.

Harris Cozy Mods

Robert Harris (TN) - The Cozy we purchased has a Vari-Eze Lamb tire on the nose wheel. It handles much better on the ground and gives a smoother ride than the stock tire.

The strakes are a cross between Long-EZ and Cozy. They go farther forward giving more shoulder room.

I am presently testing a ground adjustable Ivo prop for our Long-EZ. Factory support has been good and they are now making larger diameter blades to improve performance. Prop workmanship is very good.

Retractable Gear Article Comments

The following was taken from a letter to me from James Foster (IL)

I was disappointed by the comments regarding J. D. Newman. There is no place for repeating hearsay and conjecture in an article weighing the merits of RG systems (if anywhere). Unsubstantiated statements that undermine the entrepreneurs in our sport do all of us a disservice. We should encourage new designs and then let the market decide if the developer correctly interpreted its desires.

Lets work toward elevating the science, and art of the canard pusher designs. Criticism is fine, but keep it constructive and fair.

EZ Retractable Main Gear, Another View

In the January issue David Orr's article, EZ Retracts, contained statements that stimulated reply from a CSA member and a non-member. The member's comments are printed in the article on the left. The other letter presents J.D.Newman of Infinity Aerospace views of the situation.

Mr. Newman's very detailed letter stated, "I hope and believe there is space for this letter to be published in its entirety, or it will lose it's informative value and purpose." He further offered to pay to have the 3 page double-sided letter placed in the newsletter.

Among other things, the letter refutes: the reason for the law suit against the Long-EZ owner, time period of the agreement, reason for the crash, negative statement that his retract system is not insurable or held in low esteem by the insurance investigator, safety concerns, and offers history of his company and an update on Infinity progress.

Past newsletter policy has been to make extended articles available to the membership. To obtain such articles members have been directed to send a SASE and request the desired information. It has also been policy to not accept any paid material for publishing.

In light of that policy, and not wishing to paraphrase Mr. Newman's information, I have decided to make the letter available through the usual extended article method.

Long-EZ For Sale

O-320 Long-EZ, low time.

Sunday, January 14, 1996

Dear David,

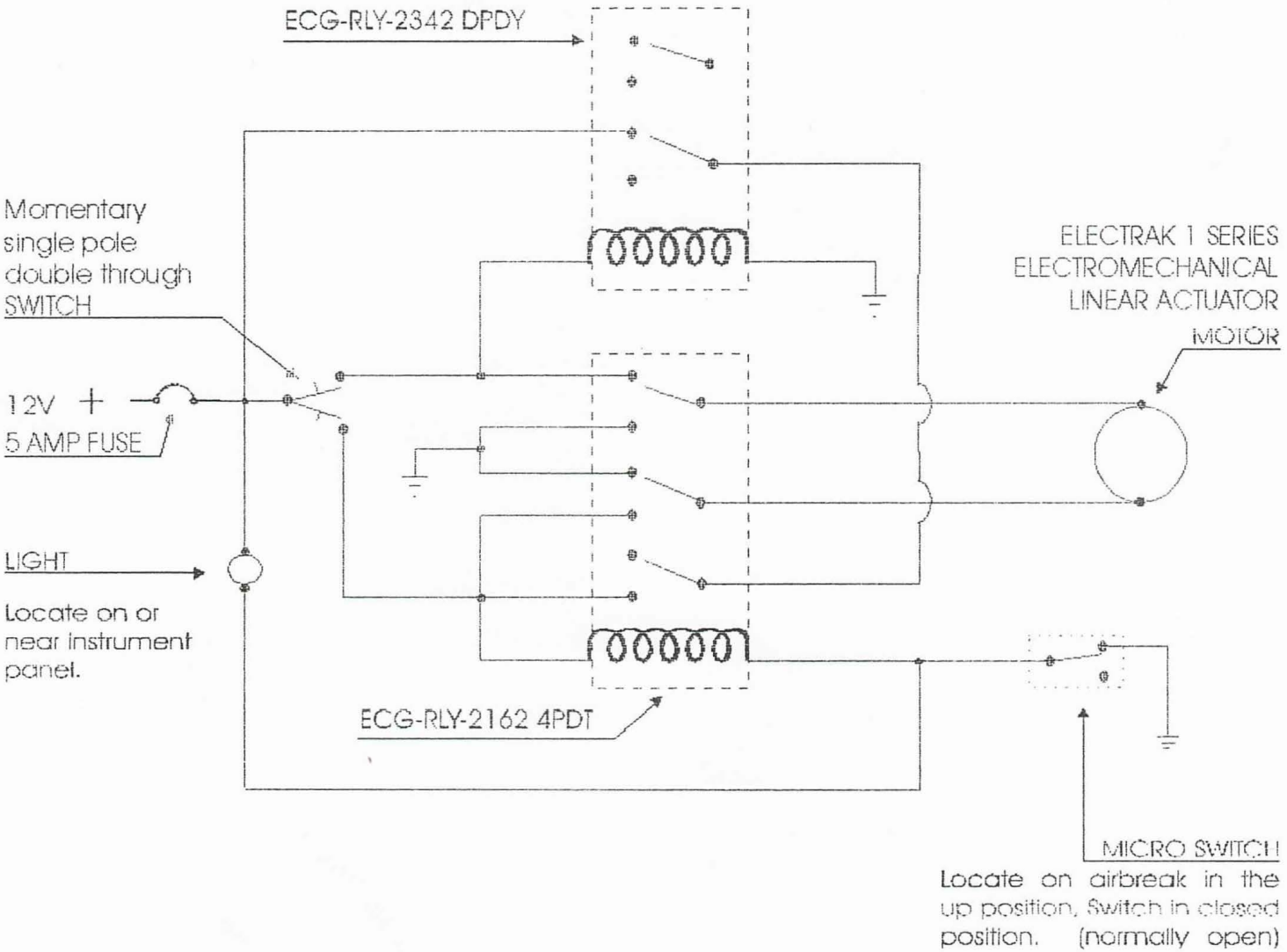
Thought Central States readers might be interested in this circuit I designed to actuate the air break. I have seen others printed in C.S. but had no luck in getting them to work. This is a good one. If you don't think anyone is interested you can just discard.

Thanks,

Eric Cobb

P.S. Thanks for the credit for the air inlet lip but it really belongs to Klause Savier.

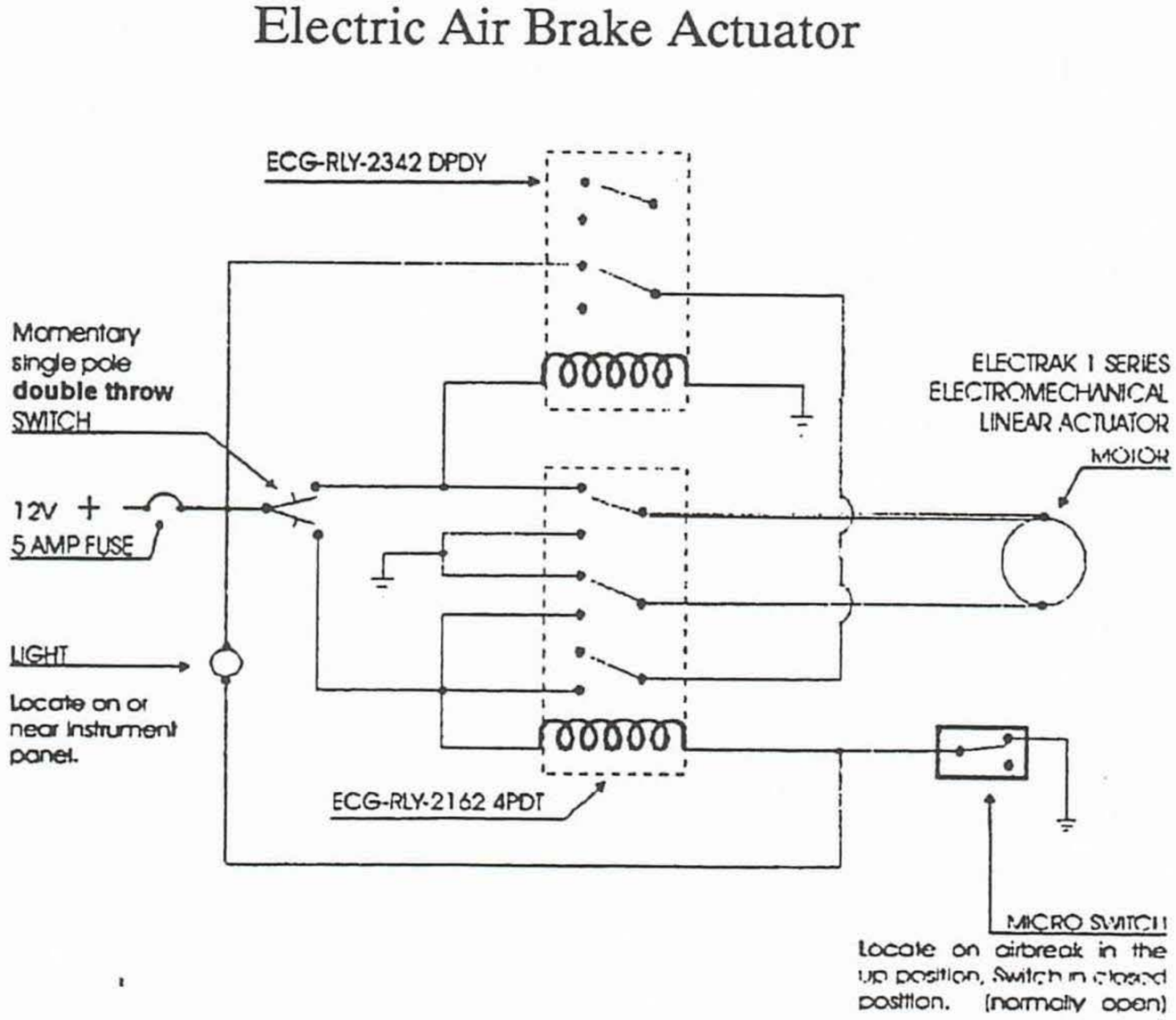
Electric Air Break Actuator



NOTE: Switch brings down landing break as long as switch is held in down position or in increments if switch is released. One momentary push brings air break to full up position. Light will light anytime air break is not in the full up position.

Electric Air Brake

Eric Cobb (CA) - I thought Central States readers might be interested in this circuit I designed to actuate the air brake. I have seen others printed in the newsletter but had no luck in getting them to work. This is a good one.



Twin EZ Engines

Mike & Linda Bowden (TN) - We recently visited Sport Plane Sales of Aiken, SC. They distribute for Jabiru Aircraft & Aero Engines of Australia.

Their 80 hp engine has been chosen to power our Two EZ. It is a four cylinder opposed four stroke weighing 123 lbs, complete with dual electronic mags, engine driven fuel pump, starter and muffler. A pad is provided for vacuum pump. Delivery of the first engine was scheduled in November and the second will arrive in early summer.