BUILDERS & FLYERS
GP4
NEWSLETTER

THE OFFICIAL VOICE OF GP-4 BUILDERS ALL OVER THE WORLD

VOLUME 18 JANUARY - FEBRUARY 1998

Jackie Yoders GP-4 of Midland, Michigan

To the GP-4 builders

An update on Cotton Candy as in the "Pink".

From October 1996 to March 1997 it was carburetor problems! As it turned out the horizontal carb (the Marvel Schebler HA-6 from a Skyline RG with an O-540 Lycoming)mounted under the oil pan on my O-540 Lycoming which was from a Commanche forced the fuel air/ mixture to turn 90 degrees. It separated the fuel from the air and fed a rich mixture to the rear cylinders and lean mixture to the front cylinders so that about 24 inches of manifold pressure it would stumble and mis-fire the lean cylinders just about the time you rotate with no place to go but UP! This GP-4 is an efficient air frame design, to get the engine to run smooth I had to reduce power to 20 inches manifold pressure and 2400 rpm and it would still climb like gang buster's and get 205 mph at 5500 feet. After 16 hours and every flight with an adjustment and not knowing what

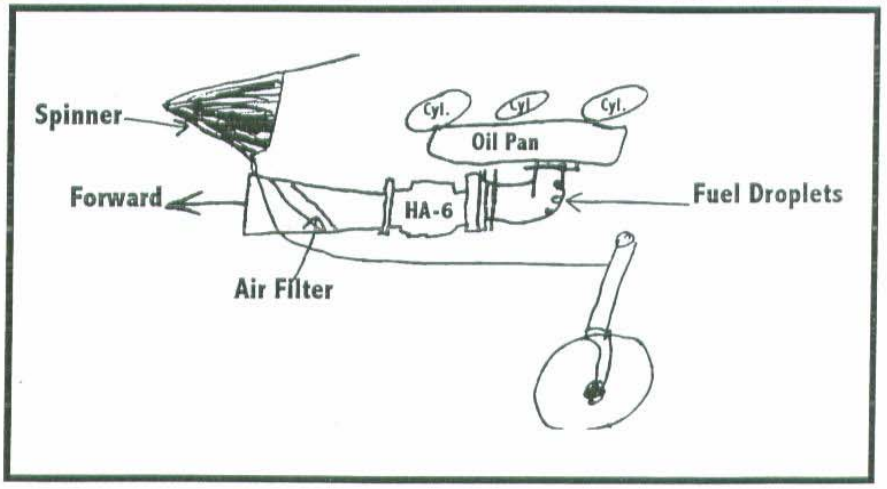
GP 4 N59JY Weight and Balance	September 9, 1996
Max aft C.G.. is at Max gross weight	
Nose 375 # plus 12 Qts. Oil 18 # =397 x -15.375	-6103.00
Main gear 540 lbs. each equals 11080 lbs. X 34.25 =	36990.00
passengers 190 lbs. + 160 lbs. equals 350 lbs. X 51 equals	17850.00
Baggage 75 lbs. X 66.625 equals	4996.87
Fuel 300 X 19.37 equals	5811.00
Aux Fuel 198 X 30 equals	5940.00
Gross weight. 2400	65,484.00
65484.00 divided by 2400 equals 27.28 inches aft of datum Maximum allowed 30 inches aft. of datum	
Most forward C.G.. Allowed is 22 inches aft. of Datum	
Nose Gear and oil 397 X -15.375 equals	-6103.87
Ma in Gear 1080 X 34.25 equals	36990.00
Jack 190 X 51 equals	9690. 00
Fuel 300.00 X 19.37 equals	5811.00
Weight. 1967	46387.13
46387.13 divided by 1967 equals 23.58 inches aft. of Datum	

would happen I told my mechanic friend I'm finished with the carb!

I called Air Flow Performance in Spartanburg, SC and talked to Don Riviera and made the decision to purchase their fuel injection system at Sun and Fun at a discount with delivery by the end of April 1997.

So while at Sun and Fun the Christmas truck ("UPS")
delivered my new S-TEC autopilot with altitude hold. So while waiting for the fuel injection system I installed auto pilot. Finally May 13 the weather improved enough to make another test fly. Fuel problems solved and power is very smooth. The auto pilot holds altitude and does its thing even with the rough air beating me up. Seven more hours in the test area and then I can start hopping passengers "Hot Dog".

I have micro-switches on the gear doors to show when the doors are totally closed, 5/16" movement and I get a light showing the doors open. The left main and nose stay shut but the right inner door gives a light after you



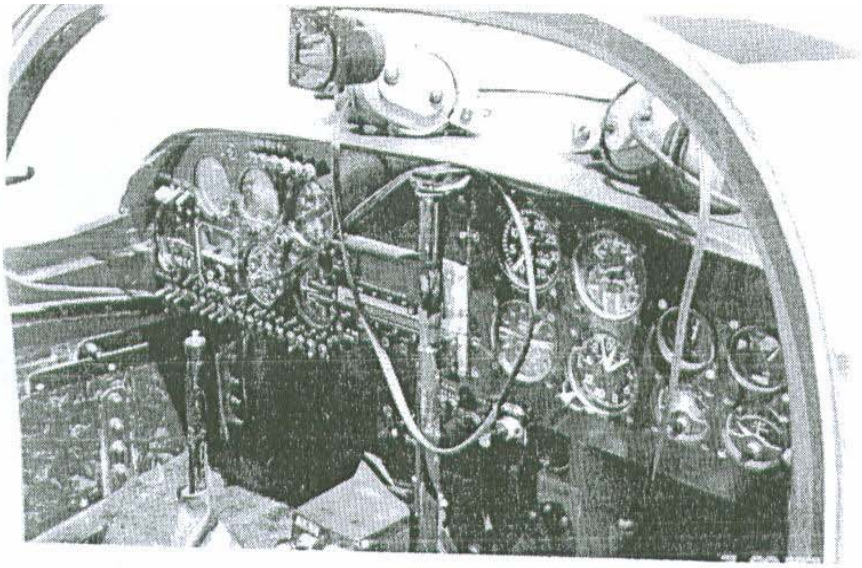
get to 240 MPH, so I still have some tweaking to do with that gear door.

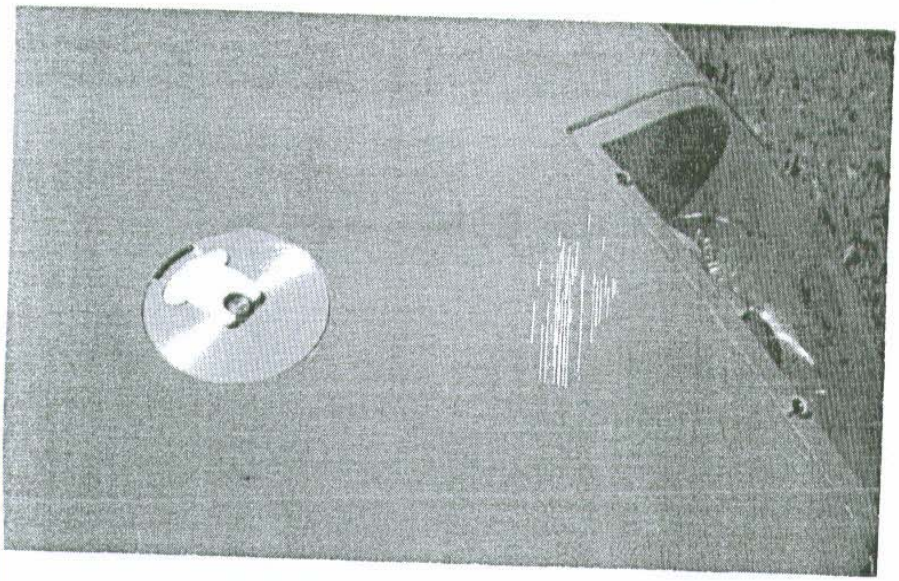
As George says..."KEEP BUILDING the flying and excitement is great!

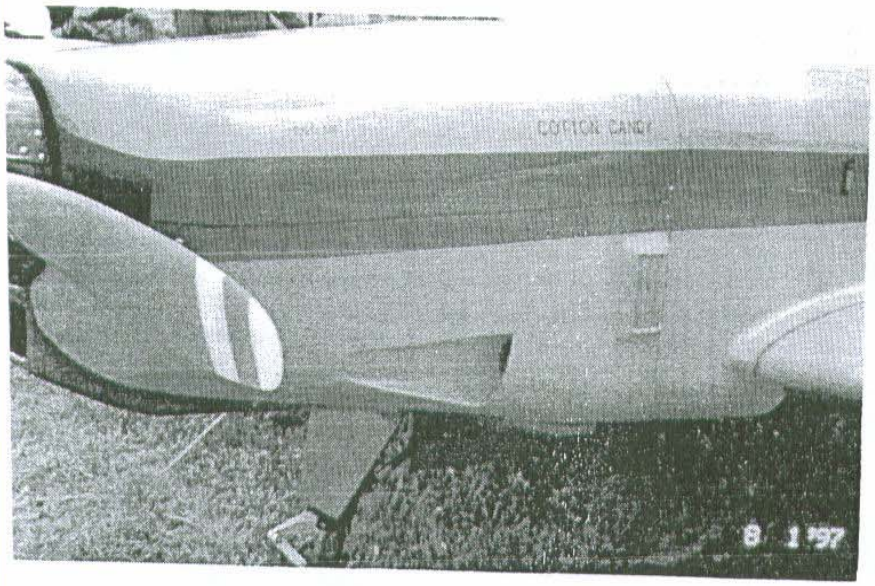
● 02-25-98 Update

I caught Jackie on the phone just before going to press with this newsletter. Everytime I get the opportunity to talk with Jackie, I come away with a smile on my face and most importantly a little smarter, especially on the GP-4! Here's Jackie's update.....

Hello fellow GP-4 builders, here a few of the numbers on my GP-4 that always seemed to be asked. Hopefully they will answer most of your questions. I have a total of 40.8 hours as of this writing. It took me 3400 hours to construct (It cost me about $10.00 a hour to build until it was time for the engine and prop!). Empty weight is 1455 lbs. and the gross weight is placard at 2400 lbs. (I'll never







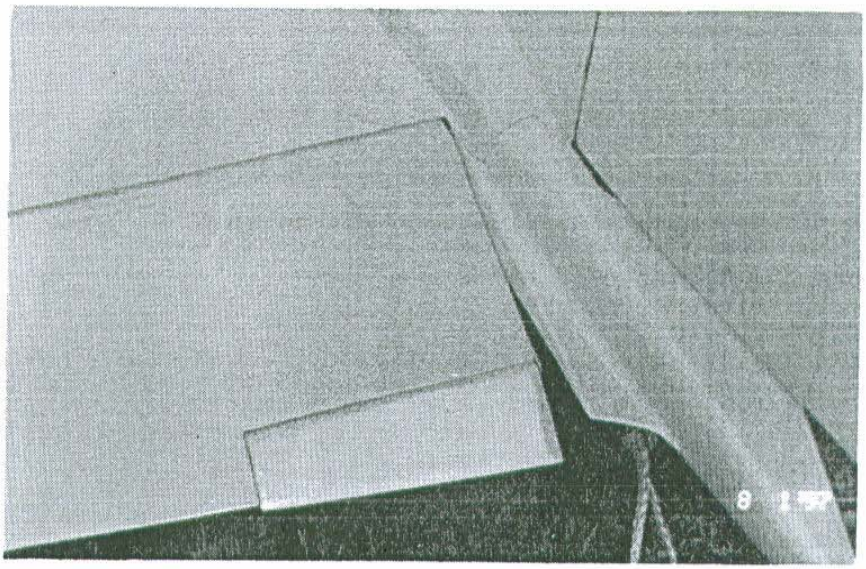
have a FAA say person say that I'm over my gross, Never!) I cruise at 24 square (24" MAP & 2400 rpm) and get 245 MPH "indicated" at 8000 feet. I don't worry about true airspeeds, I've found out over the years if I always figure on indicated I'm always there on time or before. In regards fuel economy, its pretty good, but I fly 24 square MOST THE TIME! My overall fuel burn to date is 14 gallons per hour. That's climb outs, cruise, descents, etc. My favorite decent from 10,000 feet is to set it up at 20" and set her at 250 mph indicated. This calculates out to 500 feet a minute. I've flown 16 passengers to date which 6 where new "Young Eagles" (more on this later).

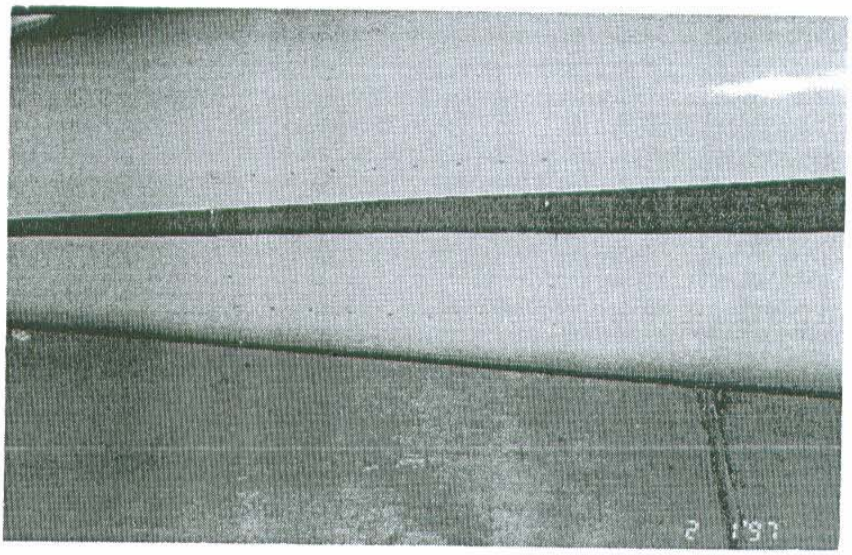
The Airflow fuel injection has performed flawlessly since I installed it. The S-Tec 50 autopliot took a little playing around to get it right, but it is excellent. It would roller coaster 500 feet up and down with oscillations of 150 to 200 feet.. The three areas that needed some tweaking was the backlash on the servo gears needed to be tighten up a little, built some standoffs for the wire coming off of the drum and cable assembly. Then the folks at S-Tec did a minor change on the electronic portion of the unit. They changed the rating of two resistors to tailor the unit to my particular aircraft. Now it is rock solid! Bank the stick left and right, front and rear.....Comes right back, on course and at altitude.

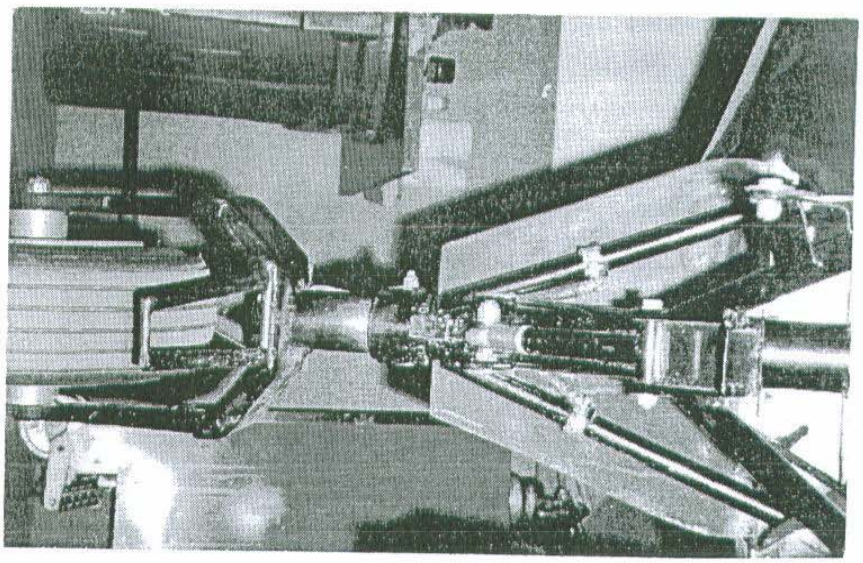
GP-4 versus the Barracuda! Both are great airplanes! The GP-4 just happens to the be HOT ROD of the two! The Barracuda stands taller and is a little easier to get in , but particularly easier getting out. Don't get me wrong. I've never had a passenger get stuck, they usually figure a way out. I highly recommend the hydraulic gear conversion that George came up with if your not to far along. I rotate at 75 mph and the moment that I'm a few feet off the ground I'm throwing the gear before 80 mph! If I miss the notch, I wait until I get to 2500 AGL, slow down to 80 mph or less and try again. I have four air cylinders, one on each gear door. I assembled the entire aircraft with the West Epoxy System by Gougeon. I

used it on all joints and I also used it in place of urethane for a wood sealer on all surfaces. Which is very handy when you need to attach some to an already sealed surface. Simply scuff up the surface and glue. I'm very comfortable with this glue....I've had a good test bed! I put together my Barracuda 20 years ago using the same West System and techniques and I have yet to have the first glue part failure in 20 years! Also I filled the cloth weave with a slurry (Epoxy and micro balloons) right after glassing the cloth to the wood structure, around 1 to 2 hours (depending on what hardener you used, you should use the slowest), while the epoxy is still wet (very tacking), squeegee on the slurry to fill the weave. This saves having to sand the cloth/ epoxy surface once it has dried. While we're on adhesives, I would suggest everyone get familiar with Vinyl Ester glue. The Stoddard-Hamilton folks (ala Glasair) have got this fuel tank construction thing down pat. There has been a problem with tanks built out of epoxy. A good portion of the composite boys (Long EZ, Cozy, Dragonfly, Etc) have tank problems using epoxy. The biggest problem is having a milky substance appear in the fuel tanks and line once they fill the tank with Av Gas. Next area is that some epoxy have a tendency to pin hole easily. I found this out early on and have no problems with my tanks.

I have a lot of people ask me what did I modify and/or change to stuff the Lycoming O-540 in the place of the IO-360. The O-540 weighs 75 to 85 lbs more than the I0-360. The main thing I had to address was the C.G. I did the most of this with the modifications of the fuel system. First thing I did was to eliminate the center fuselage mounted fuel tank. Next I extended forward fuel tanks (the ones in front of the spar) all the way out to the tips. Then I went on to make a somewhat of a wet wing behind the spar in the 3 outer panel compartments (just outside of the gear). This for the most part offset the weight of the O-540. I now have a total fuel capability of 71.4 gallons. With this type of fuel system setup, one needs to be very disciplined with his fuel management. I/2 hour left, then 1/2 right, etc. I landed one day with a pretty good cross wind and the out of balanced side was







not in my favor. At one point I was at full aileron deflection, It was a handful!

That's about it for this time. I'll go into more detail about the fuel system for a future newsletter and I'll dig up some photo's of a couple buddies from the police/Sherriffs department and myself hauling Cotton Candy to the airport. It was completely painted, assembled and ready to fly!

I've also included a weight and balance worksheet for everyone's review.
Jack Yoder
Midland, MI
GP-4 N59JY

Thanks again Jackie for the update. In closing though, I would like to thank you in behalf of the entire group, myself and all the EAAers out there. You see Jackie has another passion other than building airplanes. As you read earlier in this article Jackie had flown 6 new "Young Eagles" in his GP-4 "Cotton Candy" . Jackie has done much more. He has a total of over a "100 Young Eagle Flight Missions" to his credit. Thanks Jackie, Our hats are off to you! - Spud Spornitz

MULTICOM

● ***The GP-4 versus The Falco***

Hello GP-4 gang,

For your information, Ed Kolano, the test pilot who evaluates homebuilt aircraft and writes
technical reports that get published in Sport Aviation and other magazines, told me last Tuesday night at our Chapter EAA meeting that EAA had

Continued on page 6

GEORGE'S CORNER

Fellow GP-4 builders,

Several builders have written or called expressing their concern for my wife Peggy. As you may know Peggy suffered a cerebral hemorrhage last August. She is now home and receiving physical therapy. We both thank you for your concerns.

Some have called regarding the mounting of the horizontal stabilizer. As you know once the stabilizer is covered all of the chord lines are gone we have to establish the correct angle of incidence to mount between the four longerons.

Assuming the fuselage is upright on your work table you should level it somewhere between station "0" and station "42". You should also level horizontally across the longerons.

The drawing (next page) shows how to get an incidence line as well as a horizontal level line for mounting as shown on drawings 5. It's important to mount the stabilizer with enough room for the elevator horn to clear the 1/4" battens between station 168.250" and station 178, also shown on drawing No. 5. It wouldn't hurt to mount the horn assembly with the pillow blocks bolted to the stabilizer spar as shown in drawing 12. This will insure you have room for the horn to swing clear of the 1/4" batten. 1/8" to 3/16" is adequate clearance.

For your interest there are only two major components on the GP-4 that are skin stressed. The fin and router assembly and the horizontal stabilizer. When I say skins stressed, I mean that the ply skin is carrying much of the bending loads as well as the torsional bending loads. That's why the skin is carried through the fuselage in the stabilizer.

The wing spar is engineered to carry all of the bending loads. The skin only carries the torsional bending in the wing structure. That's why we can cut holes in wing skins for wheels and struts without compromising the bending integrity of the wing.

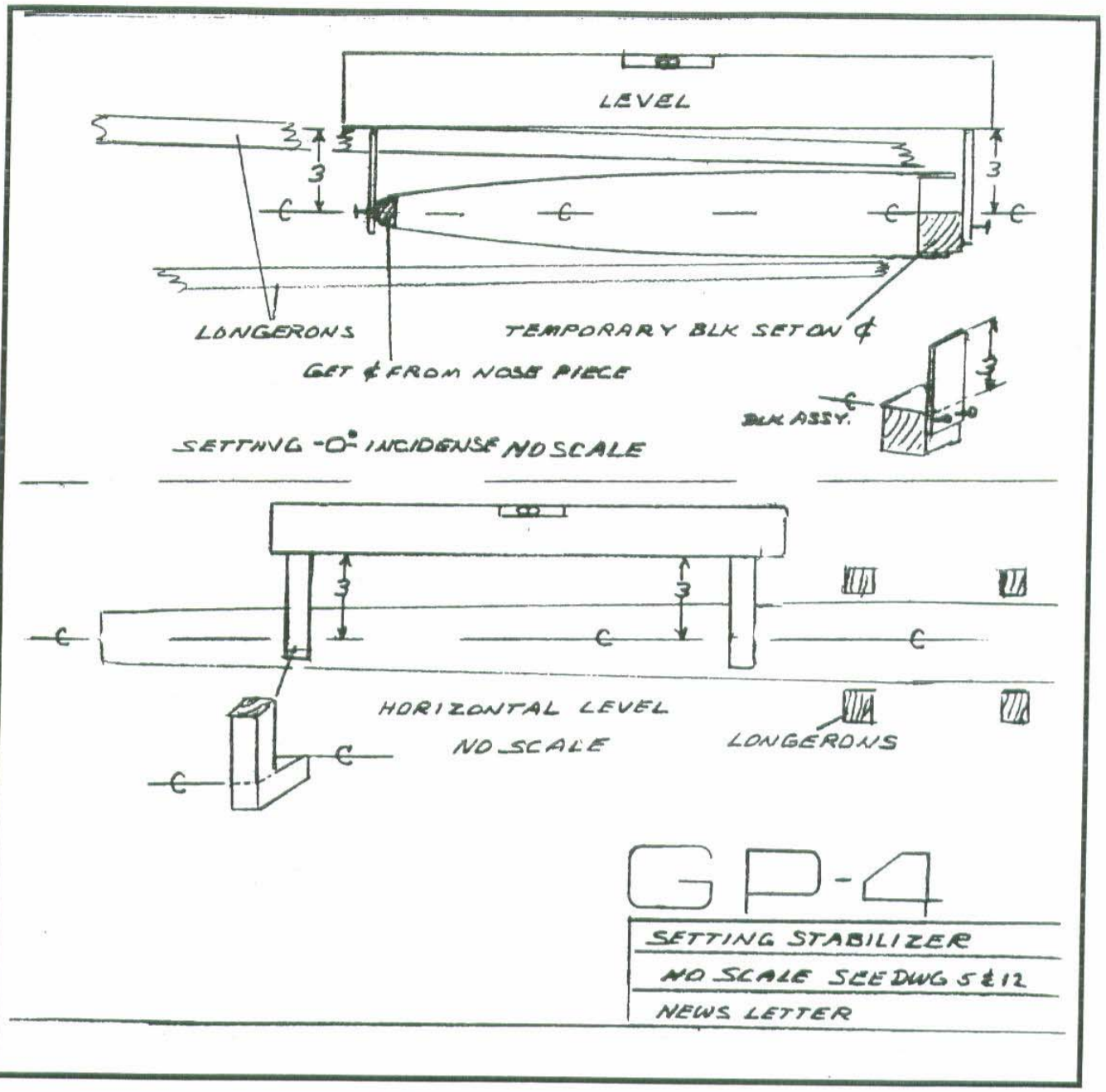
The GP-4 wing spar is also engineered to bend with an equal load this distribution to the area being loaded. That's why we taper the spar caps after they are laminated otherwise you would probably have a stress riser in the spar. If you wrap a fly rod with the piece of tape and hook a big one the tip will probably break where the tape is. That's a stress riser!

None of stress loading as important to your building project, but it may help answer some your questions when you'll "Why in hell did he design it like this"?

If any of you builders need a quick question answered its best to call (916) 483-3004. I am home a lot these days.

Regards to all,

George



"Multicom" Cont'd

agreed to "sponsor" (i.e. pay his expenses and salary) the idea of a side-by-side report on the two Wooden Wonders, GP-4 and Falco. It will commence sometime this summer, don't know when, it won't be done by Sun 'n Fun but Oshkosh is a possible. Kolano will contact George directly, but I have told him about your aircraft as well and he will probably like to see (if not fly) both.

Stu Fitrell

● Strut Springs

Spud and Fellow GP-4 builders,

I've been trying to find springs for my gear legs. The address listed on my plans for Danley machine didn't bring up a business phone number on my computer phone directories.....Well, I finally got a reply from Danley Die & Machine about the springs for my gear leg springs, they gave me two different phone numbers to use.

Holiday Machine in Seattle Wa. (205) 583-0600

Deco Tool in Minesota (612) 553-2020

These are dealers who sell these springs.

Gordy Valgren
Minot, North Dakota

THE CLASSIFIEDS

For Sale: ***New Hydraulic Gear Plans Upgrade.*** Convert your GP-4 manual landing gear system to hydraulic - electric system. Complete with emergency back up system. (Note: System must be installed prior to wing skinning!, no retro-fits) Complete print package for $150.00 Mail your checks to: George Pereira 3741 El Ricon Way, Sacramento, California 95864 phone (916) 483-3004

For Sale: **Pre-fabricated composite components for GP-4.** Cowling - $750.00, exhaust blisters - $110.00, inlet ramps - $110.00, tailcone - $105.00. Complete four piece package for $1000.00 and $75.00 for packaging charges. Shipment will be sent "Freight Collect" - Jake Jackson - Rio Linda, CA (916) 992-0608_E-mail J7200@aol.com

For Sale: **Quality custom fabricated metal components for your GP-4.** See GP4BFN issue #4 for complete component listings and pricing. Please allow generous time allowances for your orders. Darry Capps, 813 Hoyer Road, Newman, California (209) 862-2707

For Sale: We have all of the GP-4 back issues (1996 and back) available for $3.00 each. Mail your checks to Bill Spornitz - 1112 East Layton Drive - Olathe, KS 6061-2936

Wanted: Looking for a GP-4 project that is "well under way" through "close to being finished". Will consider all projects. Contact me at (503) 646-5276 or by mail at Edward Mitchell, 13835 S.W. Devonshire, Beaverton, OR 97005

For Sale: Holley fuel pump #12-802 and Moroso #65770 high pressure spring as depicted in GP4BFN #14. $110.00 for both items. Shipping charges inside the U.S. $10.00. Shipping charges outside of U.S. will be quotes on request. Mail your checks to Bill Spornitz - 1112 East Layton Drive - Olathe, KS 6061-2936 evenings after 6:30 P.M. (913)397-0518 Phone and Fax line

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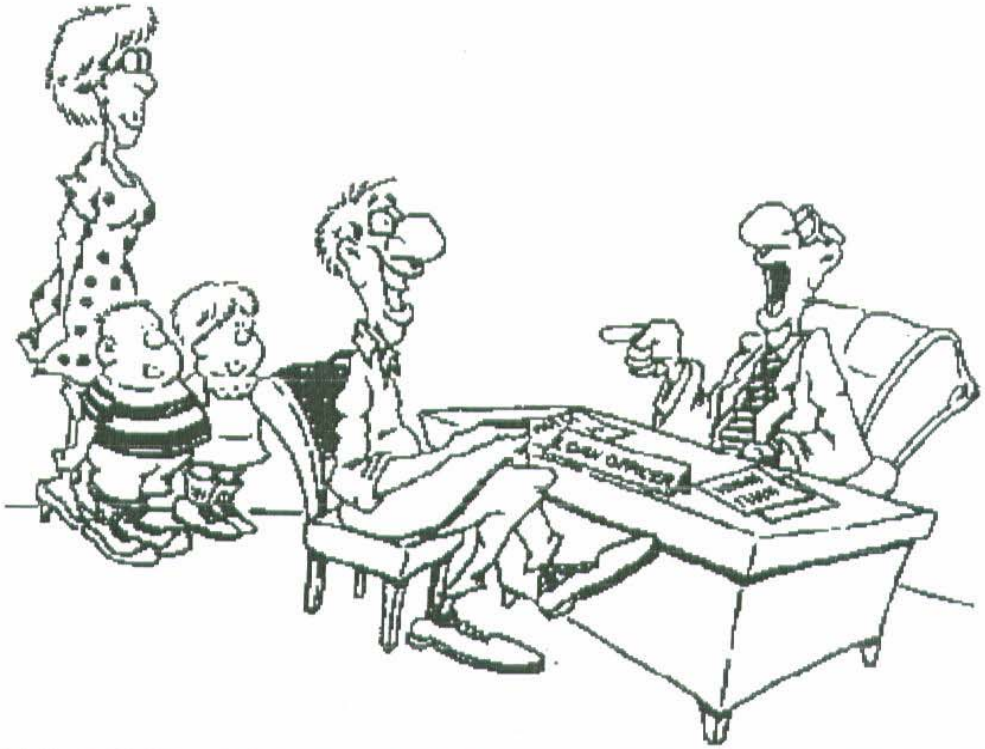

"I'M SORRY SPUD. AGAIN....YOU CAN'T LIST YOUR WIFE AND KIDS AS COLLATERAL FOR YOUR GP-4 AIRCRAFT KIT OR A LYCOMING IO-360!'

BUILDERS & FLYERS GP4 NEWSLETTER

1112 EAST LAYTON DRIVE
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FIRST CLASS MAIL

NEWS FOR CRAFTSMEN OF FAST WOODEN AIRCRAFT!