GP-4 BUILDERS & FLYERS NEWSLETTER

June-Sept 2004
GP4BFN 44

Inside

CONGRATULATIONS
Jim Simmons
On winning
"Reserve Grand Champion Plans Built"
At
EAA Airventure Oshkosh 2004 !!

Jim and Betty Simmons standing in front of their award winning GP-4 at Oshkosh Airventure. (see the tower in background).

Jim and Betty recently completed a month long coast to coast adventure in the GP-4 , covering over 6000 miles. Along the way they made stops to visit sights and friends in New Jersey, Virginia, Tennessee, Arkansas, New Mexico, Colorado, Las Vegas NV, San Francisco CA, Portland OR, Montana, South Dakota, Oshkosh, WI, and finally home in CT.

Jim report s it was a great trip, in a great airplane!!

HYDRAULIC GEAR PLANS NOW AVAILABLE

As you look through your plans, you will note that the GP-4 has a manual landing gear retraction system. The manual system has worked very well, but I received feed back from builders asking if I would develop an electric hydraulic gear for the GP-4.

I spent about a year of research to design and build a working mock up that I feel has all the amenities to do the job. It has since been flight tested and it works well.

The advantages of the hydraulic system are obvious. Flip a switch, and fly the airplane. Less parts to build, and you get the Johnson bar out of the cockpit. Disadvantages? Possible electric hydraulic failure, approximately 5 to 6 more pounds weight, and maybe some more expense. And, the F.A.A. requires a back-up system, even in a home-built. This system has an excellent emergency back-up, consisting of a mechanical cable uplock release and nose gear extension. It is both simple and foolproof.

Both systems have advantages and disadvantages. The manual system requires no redundant back up to get the gear down. It is all mechanical, the F.A.A. feels it is fail safe. Its less expensive if you build your own parts. The main disadvantage is muscling the Johnson bar between the seats about 90° to get the gear up right after take off. There are also more parts to build, all the push rods, bellcranks, and the air drive uplock system.

No machine work is required for any of the components. Plans are available for $150.00 from Osprey Aircraft. You can find the address and an order form at www.ospreyaircraft.com.

George

BUILDER'S RESOURCE

BY BOB FOSTER

Many GP4 builders who have completed their fuselage have installed Jim Weir's antenna kit. Jim has many more "Can't Live Without" electronic designs that will save you beacoup bucks or as he says, "A champagne panel on a beer budget." He has published a full panels worth of designs in Kitplanes for several years, from about 1996 to the present. I have listed all the publications and subject that I have. Perhaps someone else could fill in the blanks.

Kitplanes Magazine

Issue Date / Page / Subject

Jan 97 / pg 87 /Coaxial cable

Mar 97 / pg 69 / Extend landing light life

May 97 / pg 72 / ELT antenna

July 97 / pg 79 / Wire rack

Oct 97 / pg 62 / Radio Connectors

Feb 98 / pg 86 / Radio "stuff"

Apr 98 / pg 20 / Altitude chamber

June 98 / pg 86 / Auto AM FM radio

Oct 98 / pg 60 / Inexpensive intercom

(I missed most of 1999 and 2000)

Dec 99 / pg 115 / VHF nav antenna

Oct 2000 / pg 49 / LED position lights

Nov 2000 / pg 65 / GPS

Jan 01 / pg 88 / Dim Bulbs

Feb 01 / pg 85 / Antennas

April 01 / pg 61 / Lamp dimmer

Aug 01 / pg 68 / Aviation software

Feb 02 / pg 43 / Engine monitor

Apr 02 / pg 79 / Battery sulfate buster

GEORGE'S CORNER

BY GEORGE PEREIRA

Fellow GP-4 builders:

I am sure that most of you are well along at transferring the #2 drawing to your work table. Hopefully, the following explanation and drawing will help the new plan holders get started.

The first line to go on the table top paper should be the center line as it is called out on drawing #2. It should be parallel to the work table side, about 16" above the table side you intend to work from and about 190" long. After establishing Station –0-, the next point should be the aft bottom side of the block which is 5 1/4" long and has the venting elongated hole in it. That aft bottom point is 25" aft of Station –0– and 14 1/4" down from the center line. From that point use a protractor to set a vertical line 88.5 degrees to the center line. Note, there are three uprights that are 88.5 degrees to the center line. The two front ones are 3/4" x 1 1/4". The rear one is 3/4" x 2". All the other uprights are 90 degrees to the center line. End measure means that the vertical upright is set and measured on either the front or rear edge of the upright for placement. If not called out, the upright is centered on the station.

Tapering the Longerons:

I recommend using a hollow ground blade for cutting with your table saw. The cut is smooth enough for gluing. I drew a black line on the 3/4" thick lumber and free handed it through my table saw without the rip fence. I set the blade very low, not over 1 inch, and slowly fed the lumber through the saw. You can also use your band saw to freehand the cut. I always use a roller stand set at table height to catch the longer work, such as ripping your longerons. If you end up sawing into your cut line, slow up and straighten out your cut. If you were as much as 1/16" shy, I would still use the longeron. The GP-4 fuselage is very strong, being longeron structured as well as skin stressed into a full monocoque structure. Since you have to build 2 sides, use saran wrap over each glue cluster to protect your drawing.

If you cut a piece at slightly the wrong angle, leaving a small gap, don't throw it away. Fill the gap with a rich bed of T-88 and cotton flock. (flock p/n 902 Wicks) Work it well into the gap for a solid joint.

Plan Error:

About the center of page 4, the top T-batton says it runs from former 88T to 178. It shoud run from 88T to Station 149 1/4. Bottom T-batton is correct.

Spoilers:

I have had a few inquiries about installed Mooney type spoilers for faster let downs. When the spoiler pops up you lose lift and increase drag. A slower airspeed and faster descent is possible with power. Most spoiler equipped aircraft fly at 18K and above, so they are very effective when flying in the higher altitude airspace. Since the GP-4 is naturally aspirated, most of our flight plans area is from 4K to 10K. I try to convert altitude loss into airspeed. You can throttle your GP-4 back to about 10" M.P. and let down 500 to 600 FPM at over 200 MPH. You do have to watch for shock cooling, but I haven't seen any in my prototype.

The 63 series airfoil we use is critical to any imperfections in the first 40% chord. No matter how good your retracted, flush mounted spoiler is, you are bound to get some disruption in laminar flow when a slot is exposed to hide a retracted spoiler. A span wise paint stripe will disrupt laminar flow with this airfoil section. I always try to wash bug strikes off my wings after each flight for the same reason.

Congratulations to Jim Simmons and John Reinhart. Both have

crafted beautiful GP-4s.

John recently called me saying he just flew his GP-4 solo after getting some duel with a Lancair owner. John's test flight story should be interesting to all of us

Regards to all,

George

NEED HELP?

Have a question, idea, or is there something you don't fully understand?

There are currently about 525 sets of GP-4 plans in builder's hands. Of course, its impossible to know how many builders are active, but we can hope :)

Help / answers / advice is only a phone call or note away. Please remember to include your plan serial number when you write, it helps to locate your mailing address.

Write or call:

George Pereira
Osprey Aircraft
3741 El Ricon Way
Sacramento, CA 95864
Ph: 916.483.3004
Fax: 916.978.9813
Email: gp-4@juno.com

BUILDER'S UPDATE

REVISED BRAKE PEDAL LINKAGE

BY JIM SIMMONS, CHESHIRE, CT

(Last issue I accidentally left off an important illustration that should have been included with this article—I've included the entire article & illustrations here again—Elton)

Jim Simmons, Cheshire, CT

During my initial test flights of my GP4, I discovered that I had difficulty holding sufficient brake pressure to execute a run-up at 1700 rpm. Additionally, I was also disappointed with the braking performance in general.

I had installed standard Cleveland Wheels and Brakes. I spoke directly with Cleveland and followed their break-in procedures to the letter. Cleveland technical support stated that the standard brakes should be sufficient for the weight and power of a GP4.

Ernie Holmes (fellow GP4 owner from MA) had the same problem and replaced his wheels and brakes with Cleveland high energy devices (Wicks PN CWB 199-197) and solved his problem. I ordered the high performance units but upon receipt it appeared that I would have to rework my main landing gear doors to accommodate the larger caliper assembly. I returned the new devices and then I redesigned the brake actuating lever at the base of the brake pedals. I made an initial change to the clevis arm and was able to hold the aircraft up to 2000 rpm.

I have now redesigned the linkage a third (and final) time and can now hold the airplane up to 2300 rpm. The attached drawing (Figure 1) shows the revised dimensions of my last version.

During an earlier visit to Massachusetts, Ernie Holmes had suggested that I install a splice and coupling sleeve on the brake pedal torque tubes to facilitate the easier removal of these shafts through the small opening in the top of the fuselage. This has proven to be a blessing and I strongly suggest that builders consider installing the split shafts.

I made the splice cuts 10 1/4" from the end of the torque tube. The two sleeves are 1" diameter 4130; 2 1/2 inch lengths. The sleeve is capable of sliding on the shaft. AN3 bolts are installed through each shaft. The aft tube splice is on the pilot side, the forward tube splice is on the copilot side (Figure 2).

George Pereira suggests filling the spliced tube section near each hole with Flox to strengthen the torque tube so it isn't compressed when tightening the AN3 bolts. I strongly recommend this modification for ease of removal of these assemblies. Thanks to Ernie for the great idea.

I do not pretend to be an engineer. I can only state that these modifications have proven to solve the problem for me.

Jim Simmons

Cheshire, CT

(see drawings next 2 pages)

The World's Smartest Man?

A pilot, Michael Jordan, Bill Gates, the Pope, and a pizza delivery man were all in a plane together traveling through stormy conditions.

Suddenly, the pilot came running back to the passengers and announced that lightening had hit the plane, and they were going to crash in a matter of minutes. "There are only enough parachutes for four of the five of us," he announced. "Since I'm the pilot, I get one!" After saying this, the pilot grabbed a parachute and jumped out of the plane.

"I'm the world's greatest athlete," proclaimed Michael Jordan. "This world needs great athletes, so I must live." Michael Jordan then grabbed a parachute and leaped out of the plane.

"I'm the smartest man in the world," bragged Bill Gates. "The world needs smart men, so I must also live!" Bill Gates grabbed a parachute and jumped out of the plane.

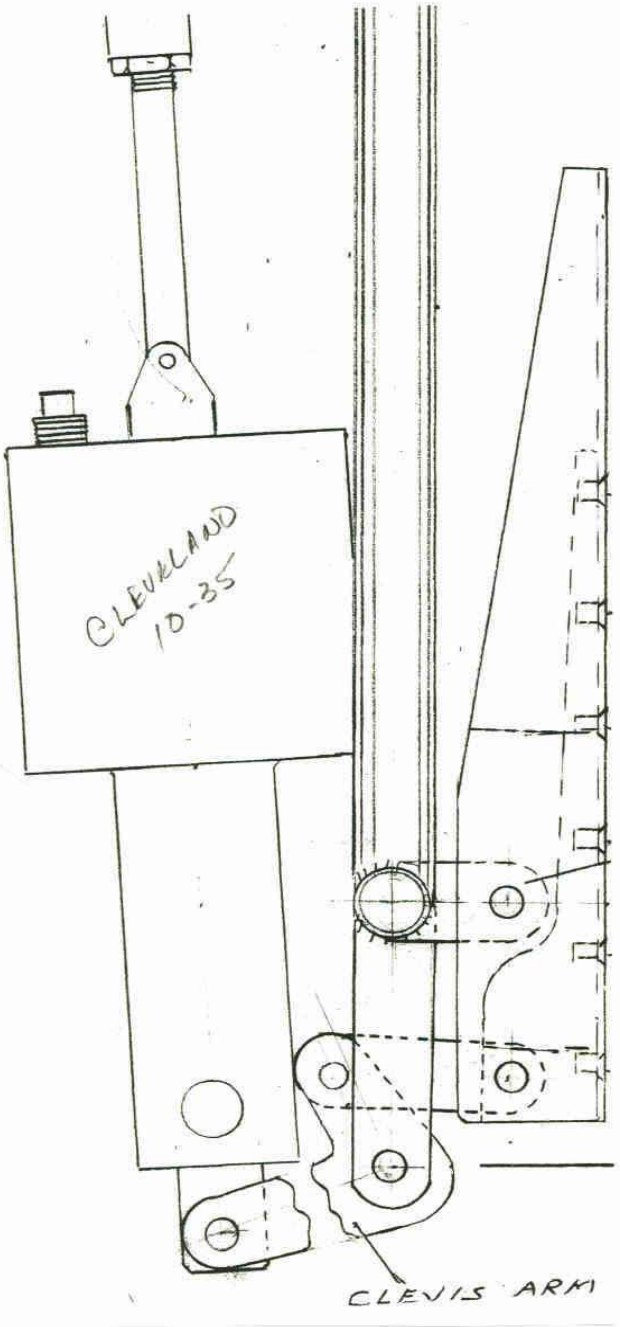
At this point, the Pope began to speak. "I have lived a long life compared to you, and you may take the last parachute. I will go down with the plane."

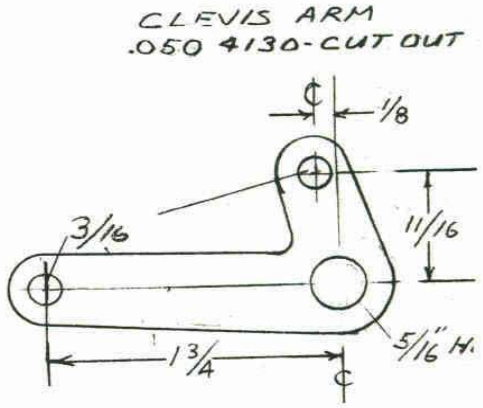
"You don't have to stay here! The world's smartest man just jumped out of the plane with my backpack."

BUILDER'S UPDATE

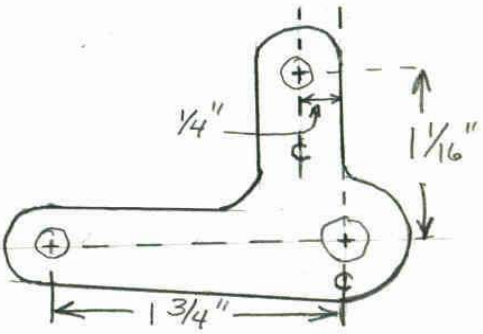
MODIFIED BRAKE PEDAL CLEVIS ARM

Jim Simmons February, 2004





ORIGINAL DESIGN FROM GP4 PLAN DWG #7



MODIFIED CLEVIS ARM DIMENSIONS

FIGURE 1

BUILDER'S UPDATE

TORQUE TUBE SPLICE FOR EASE OF REMOVAL

Jim Simmons February, 2004

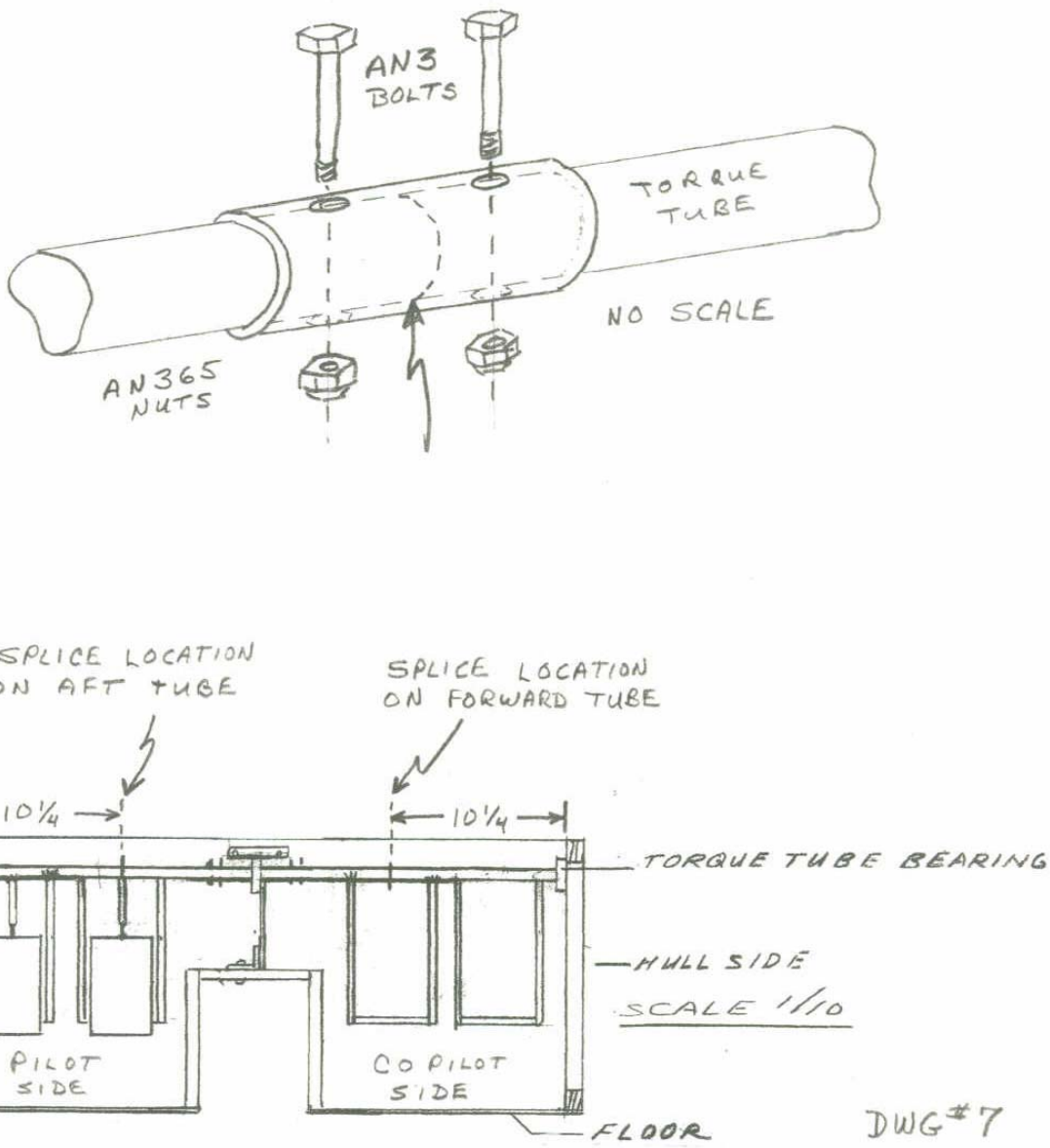


FIGURE 2

BUILDER'S UPDATE

LANDING GEAR STRUT REINFORCEMENT

BY JIM SIMMONS, CHESHIRE, CT

After approximately 50 hours of flight on my GP-4, while I had my GP-4 up on jacks and was inspecting my main landing gear, I discovered that I had an excessive amount of 'side to side' play in the 'hard bronze keys' which ride in the 4 ¾" vertical slots. See figure #1 for original plans view. I assumed this was due to initial wearing of the slots.

I decided to create a new set of wider keys to match the slot width. This was done and successfully removed the excessive play.

Following approximately 40 additional hours of flight, once again I found that I had an excessive amount of 'side to side' play with the new keys in the slot. Further investigation revealed that the slot was not actually wearing, but the tube in which the slot is machined, is actually bowing out, creating an oval or out of round condition.

To prevent this from occurring further, and to restore the tube to its original shape, I've created a two piece aluminum collar which fits over the outside of the tube assembly and 'squeezes' the tube back to its original round shape. This collar was so effective that the oversized keys needed to be removed and the original keys be reinstalled.

The collars are fabricated from one inch thick, solid aluminum stock. Figure #2 illustrates the dimensions used for the new collar assemblies. The two halves are bolted together using (4) cap screws in each assembly. The top section has been recessed for the cap screw heads. The bottom section is tapped to receive the caps screws. These collar assemblies are then positioned on the left and right main landing gear strut, making sure that they do not interfere with the brake line or wheel key travel. Figure #3 shows the actual collar installed on my landing gear leg.

Once again, I am not an aeronautical engineer, but I believe that this modification will only serve to improve the overall reliability of the landing gear assembly and installation of these collars should be considered.

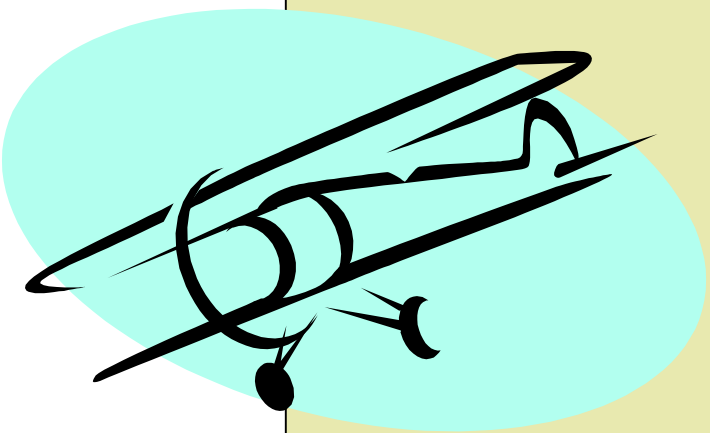
Have You Been Flying Again !!

A fighter pilot goes to a bar after a good day's flying. Whilst there he meets a young, attractive and available lady. She is charmed by his tales of aerial combat, high speed flight, and death defying feats. The inevitable happens and they slip away to somewhere more comfortable for an evenings intimate entertainment.

Much later that night the pilot drives home to his long suffering wife. On the way home, he puts on his oxygen mask, and draws the straps up as tight as they will go. When he gets home he removes the mask and bravely enters the house.

Immediately he tells his wife exactly and honestly what he has been up to that evening.

She replies: "Don't you lie to me, I can see you have been flying that damned airplane again".



BUILDER'S UPDATE

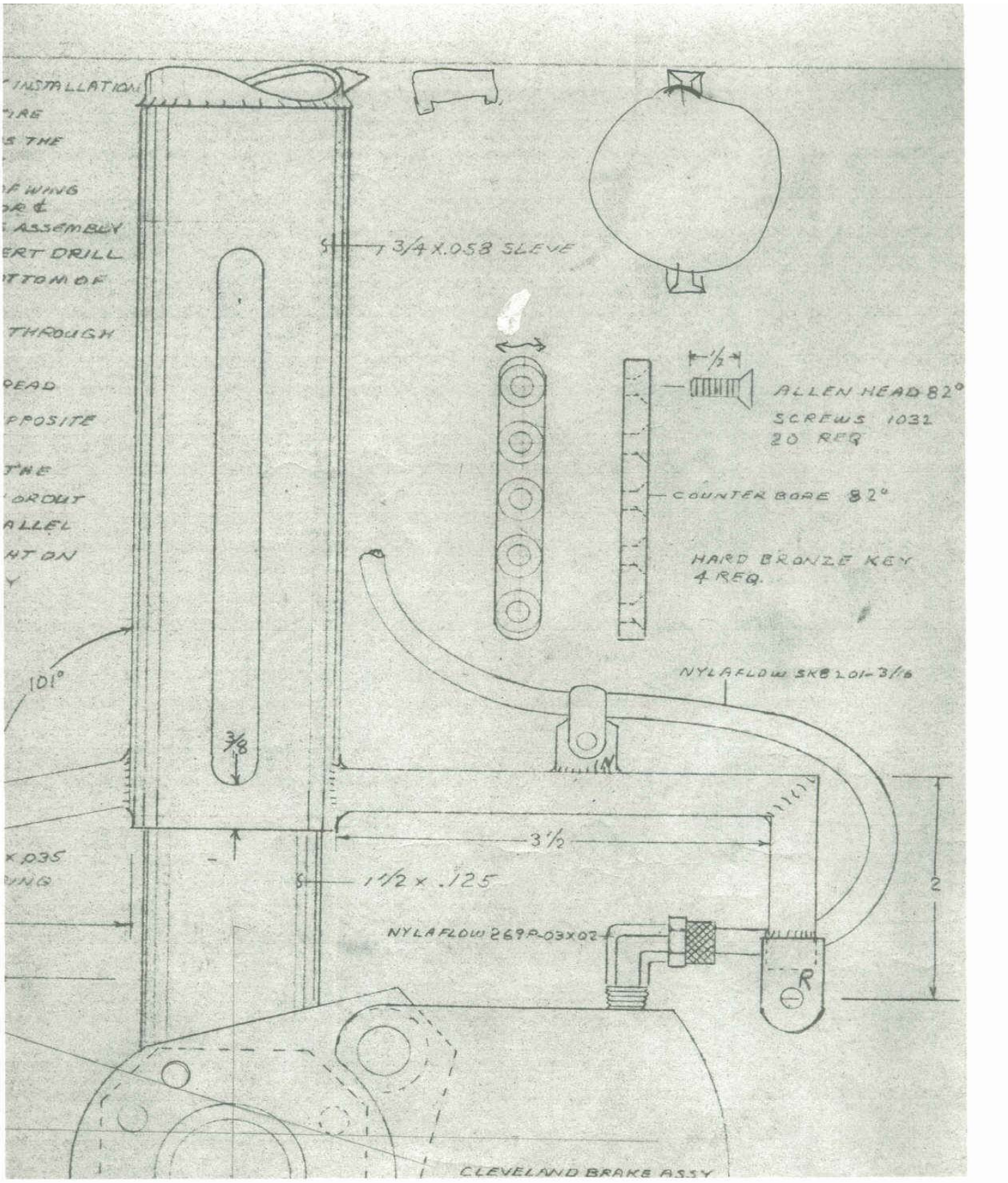
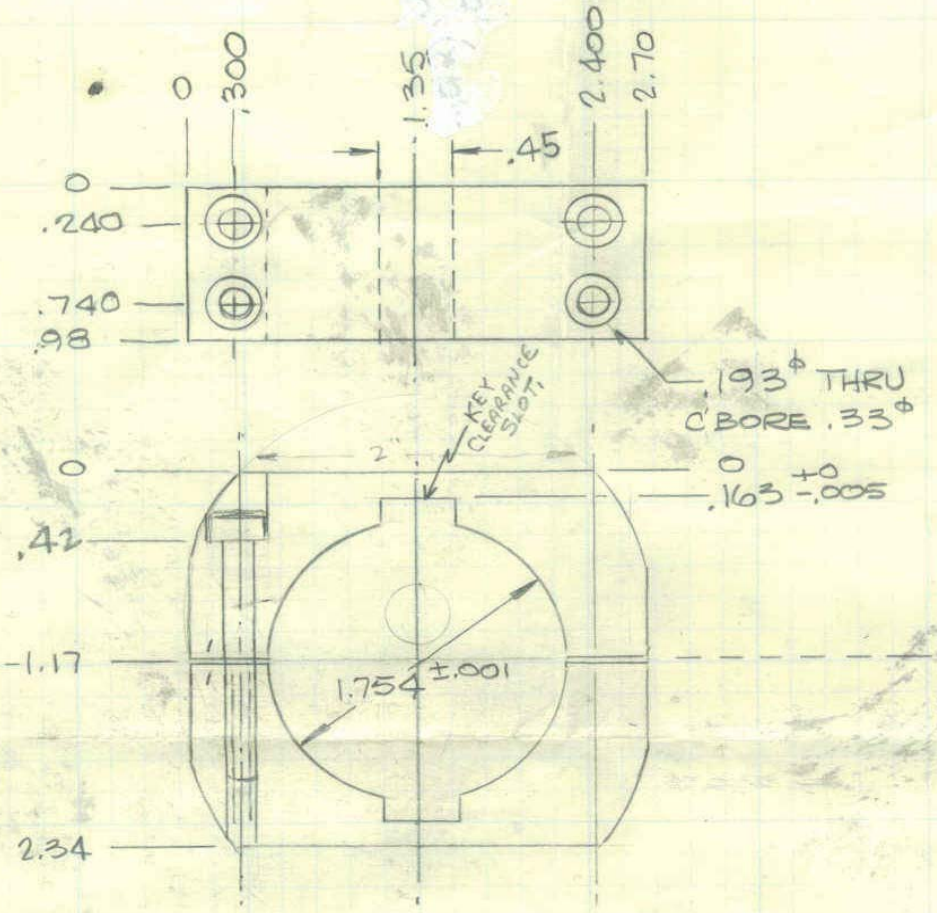


FIGURE 1

BUILDER'S UPDATE



LANDING GEAR COLLAR DRAWING

FIGURE 2

BUILDER'S UPDATE

BUILDER'S UPDATE

HYDRAULIC LANDING GEAR SUGGESTIONS

BY JIM SIMMONS, CHESHIRE, CT

I have encountered some problems with my hydraulic landing gear assemblies which I wish to share with other builders for your information and consideration.

Background:

I had built and installed the hydraulic landing gear per George Pereira's plans. During a March 2003 discussion with Pat Salomone, GP-4 builder and flyer in Florida, he had suggested the addition of a gusset to support the tube at the center forward section of the main gear truss. This tube houses the 3/8" diameter stud used as the pivot for the actuating link (hydraulic gear drawing, M-6). I added the gusset as illustrated in figure #1. After approximately 65 hours of flight time, during a preflight inspection of the left landing gear assembly, I discovered a crack in the forward tube near the point of the gusset attachment as illustrated in figure #2. I then removed the landing gear trusses (left and right) and created an additional gusset to reinforce the entire area of each strut. The cracked area was welded together, and then the new support was cut from a section of 1" diameter tubing and welded in place over the gusset/tube connection as illustrated in figure #3.

NOTE: It is significant to note that I had modified the 'Rear Gear Truss Clevis' per GP4 Newsletter, Volume 39/40, and this greatly facilitated the easier removal of the landing gear assembly.

Update:

I had now been flying my GP-4 for about 90 hours when I had a failure of the left main landing gear leg which resulted in damage to the left gear door, the left horizontal stabilizer, the left elevator and the tail cone (stinger) and tail light assembly. The good news is that the gear stayed up enough to keep the left wing tip from touching down. I must admit that the failure occurred on a less than perfect landing whereby I dropped the GP-4 in, from my estimate, of less than two feet. I was landing at an unfamiliar 2,000' strip and got too slow during the flare. However, I believe that our landing gear should withstand such a landing.

I'll do my best to describe the nature of the failure and the measures which I took to prevent the same type of failure in the future. Hydraulic gear drawing, M-6 illustrates the 3/8" bolt installation (see figure #4). Per the plans, the bolt is inserted into the ½" X .065 tube and retained by a rivet approximately ¼" into the tube. The bolt failed at the rivet hole.

Following the failure, I removed the remaining bolt section by tapping into the bolt and pulling it out of the sleeve. I reshaped the tube (which naturally became deformed as a result of the failure) and re-welded it together. I then took the next larger diameter 4130 tubing, and welded it over the full length of the original tube. The result is I have now doubled the wall thickness of this sleeve.

When I installed the new bolt, I chose not to use a rivet to retain the bolt into the sleeve. Instead, I drilled and tapped the bolt, as far back as practical, and used an 8-32 cap screw to retain the bolt within the sleeve (see photograph, figure # 5). The result is that the bolt is completely solid in the forward section. I believe that the rivet hole weakened the bolt and created the opportunity for a failure at this location. And yes, naturally, I did the above described modification to the right main landing gear as well.

Clearly the best answer is to learn to land your GP-4 as smoothly as possible, and this failure may never ever happened. However, I am human, and I believe that I am, at minimum, an average pilot who may not grease it on every time.

I do not pretend to be an engineer, but I believe that the modifications I've created should be considered when building your landing gear truss assemblies. Apparently there is a great amount of stress at this attachment point and I believe any additional reinforcement can only help distribute the loads.

There is an additional change I would recommend to all builders of the hydraulic landing gear. I have reversed the physical location of the "gear down" micro-switch position

BUILDER'S UPDATE

from being attached to the lower (shorter) link to being attached to the upper (longer) link. I had the operating links built as drawn and, because of the required amount of flexing, I felt uncomfortable with any routing of the wiring to the switch assembly. The relocated switch location created much less flexing in the cable attaching to the "gear down" switch and permitted routing of the wires with absolutely no flexing at the connectors.

During Oshkosh 2004, there was much discussion of other types of landing gear failures and I encourage each builder who has experienced a failure, to write about your experience and any corrective measures to help our fellow builders.

Jim Simmons

Cheshire, CT

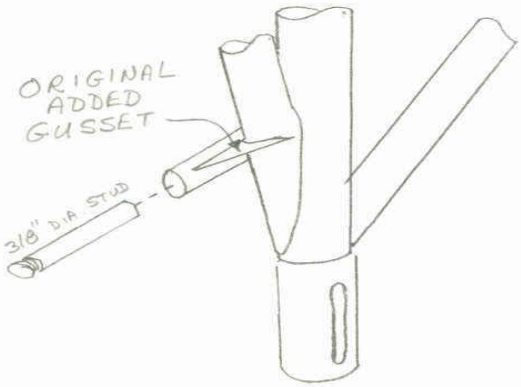


FIGURE 1

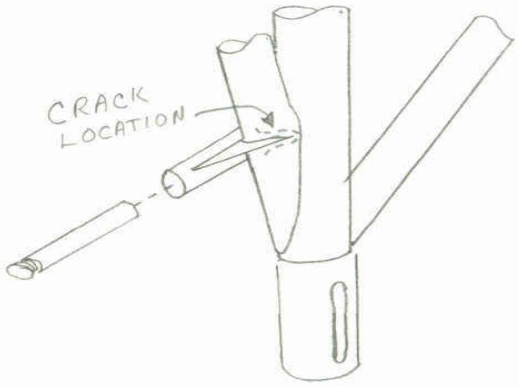


FIGURE 2

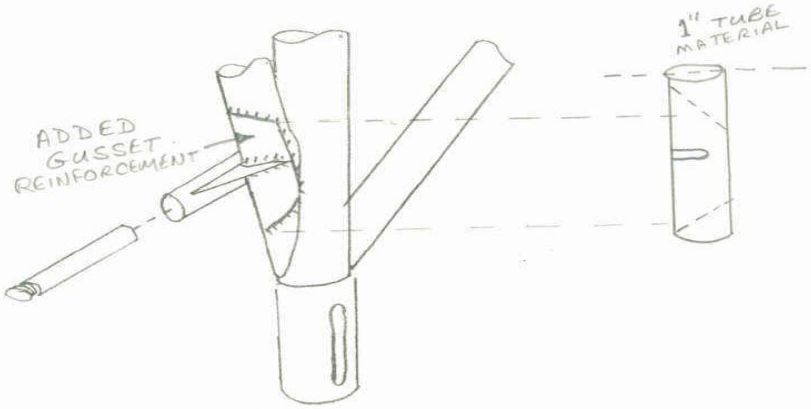


FIGURE 3

BUILDER'S UPDATE

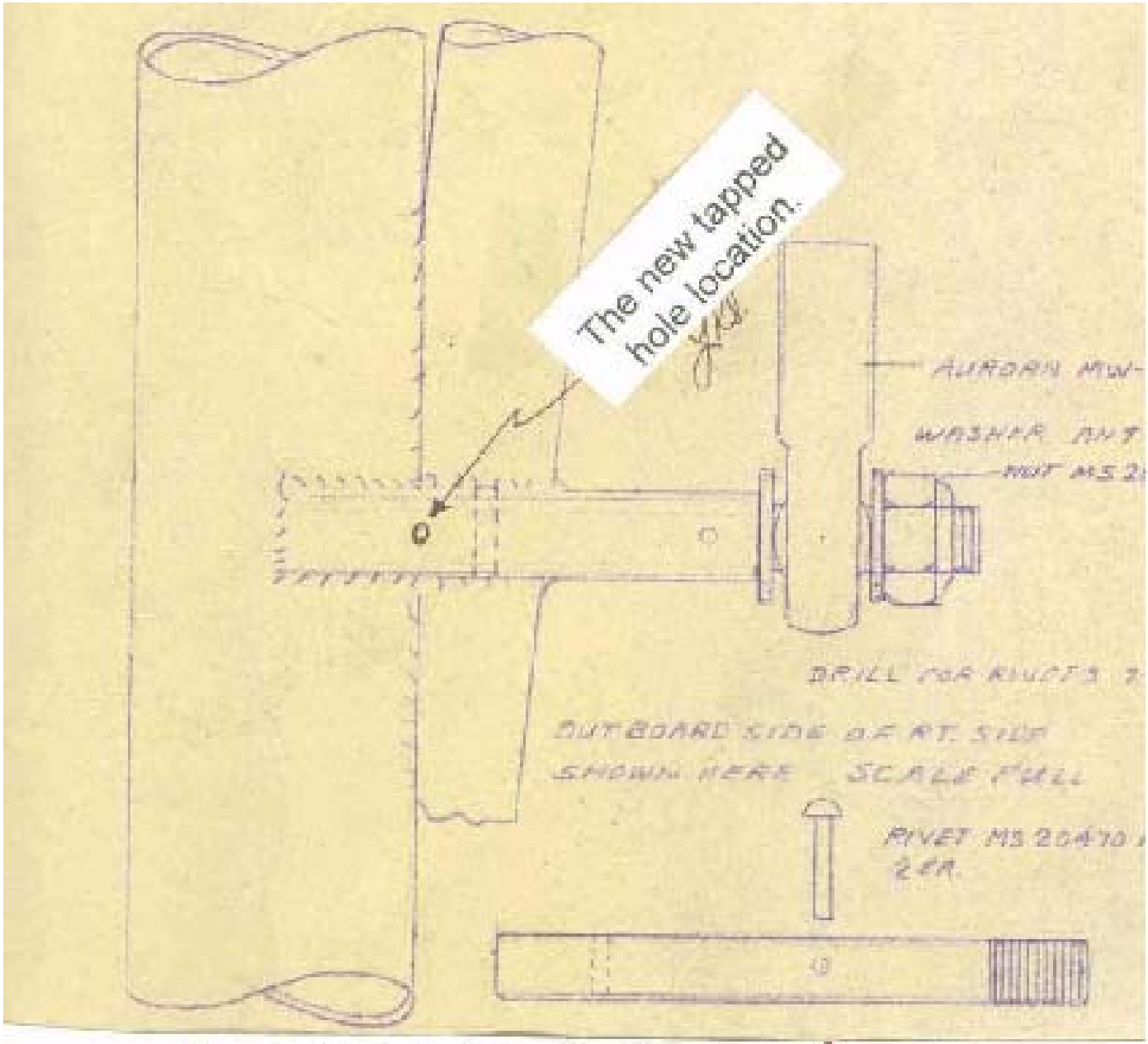


FIGURE 4

BUILDER'S UPDATE

BUILDER'S UPDATE

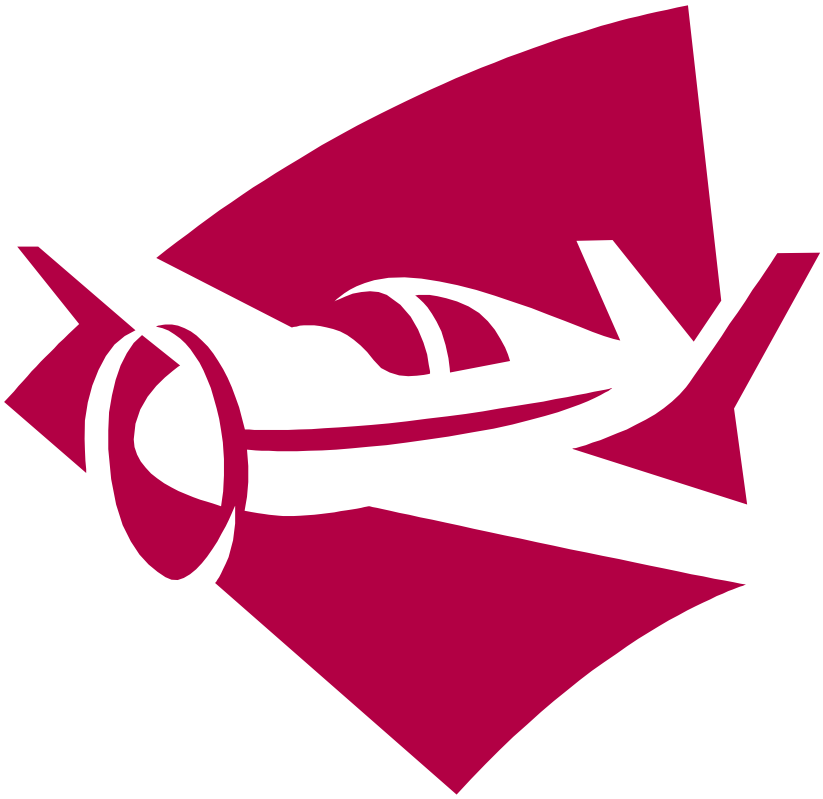
USE OF AIR CYLINDER TO OPEN/CLOSE THE NOSEGEAR TUNNEL DOOR

BY JOHN REINHART, FORT WORTH, TX. GP-4 N233CR

Anyone who has the manual retract system using the Johnson Bar and decides to use an air cylinder to close and open the long nosegear tunnel door will experience problems when you attempt to retract the landing gear.

The spring inside the cylinder is not strong enough to counteract the force of the airflow around the forward nosegear door which will blow the door inboard at an angle behind the nosegear. The nosegear strut will jam against the door when you attempt to retract the gear quickly. I filmed it from a chase plane and watched it happen. If the gear is retracted slowly, the forward door will clear long enough to allow the airflow to blow the long tunnel door out of the way, but this takes time and work.

The fix is simple and proven on two airplanes - mine and one other. Add an ear to the nosegear fork and an aluminum angle rub block to the nosegear door as shown in these photos. As for N233CR, I have completed the 25 hour test flight requirement and found no adverse flight characteristics. The airplane stalls clean at 73 mph and at 64 mph in landing configuration. We ran three series each and obtained the same results. Flutter tests were run up to 260 mph with no problem. The airplane is a joy to fly and handles great. I get about 220 true at 25" and 2500 rpm and have had it to 235 several times but really haven't pushed it any further. With all the turbulence here in Texas and the thick hazy atmosphere where you can't see even on "clear" day, I've had to keep it down to around 170-180 mph and get that at around 20".



I open the alternate air door to get air from inside the cowl for start up, taxi, take-off , and landing to keep the dirt and bugs out of the fuel injector servo since there is no air filter. I use about 5 degrees of flaps for take-off. The airplane comes off about 65-70 mph and goes through 100 mph very quickly. I climb to 1000' AGL then slow to 90 mph and retract the gear, nose it over a little, add power, close the alternate air door, and retract the flaps, then get on my way. The gear comes up quick and easy (so quick one day that I didn't get my hand turned out of the way and my thumb got caught between the handle and the latch and put a nasty gash on my thumb that wouldn't stop bleeding). On entry to downwind, the gear comes out of the wells between 140 and 135 mph to slow the airplane, then at 115 the gear goes full down and locked. I fly the downwind at 100 mph with gear out and 10 degrees of flaps and try to fly the final approach at 90-95 mph with full flaps and nose up trim, cross the fence at 85 and try to touchdown around 75.

BUILDER'S UPDATE

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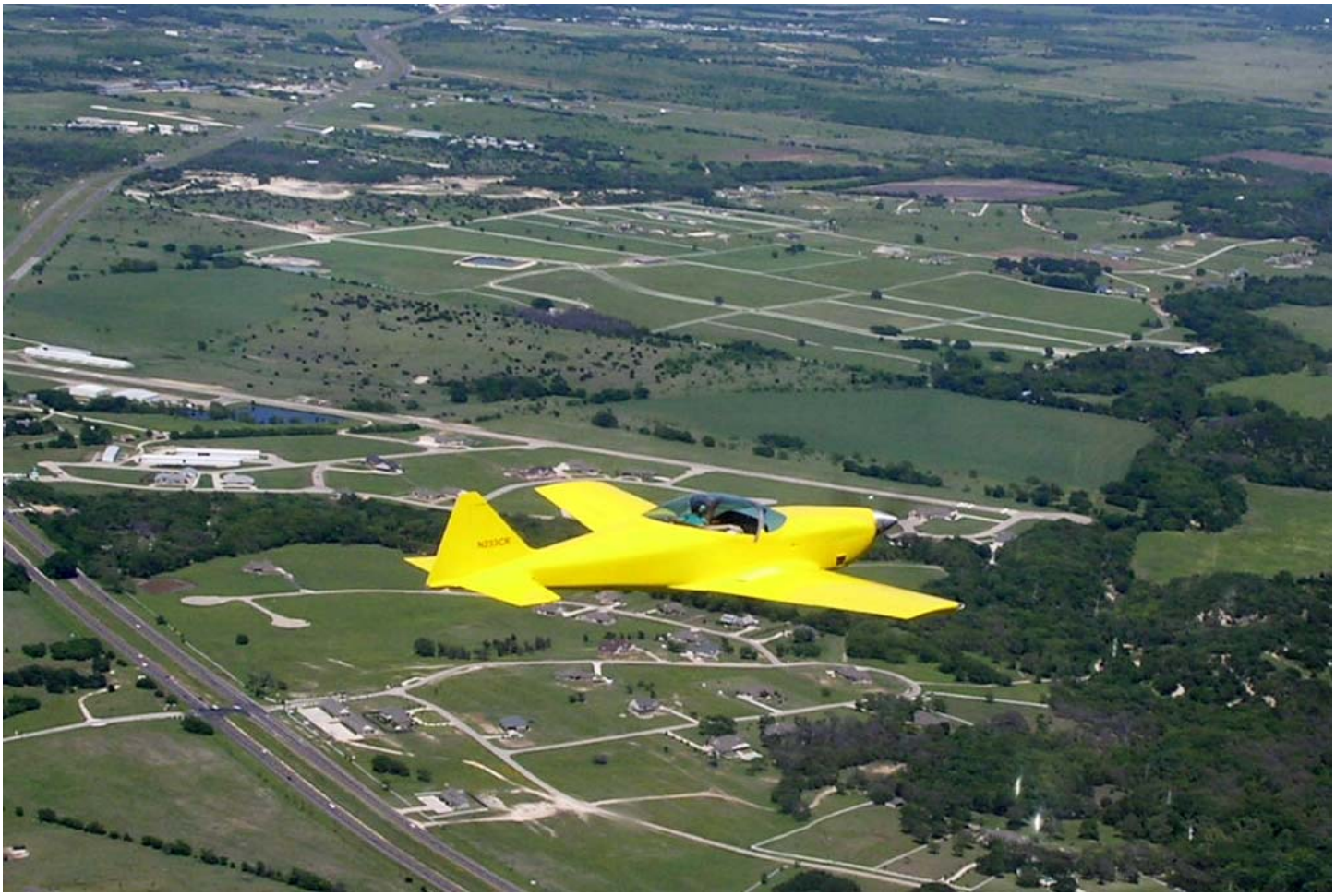


What a Beautiful Sight !!!

Here is N233CR in flight looking southwest to northeast. Just above the airplane is Bourland Field (50F) southwest of Fort Worth, Texas, where I've been since 1987. It's 4000 X 60 and where the houses are (left wingtip) used to be the absolute best grass strip in the DFW metroplex

*** Here's a great website to check-out: It is all about abandoned and little known airfields.

www.airfields-freeman.com

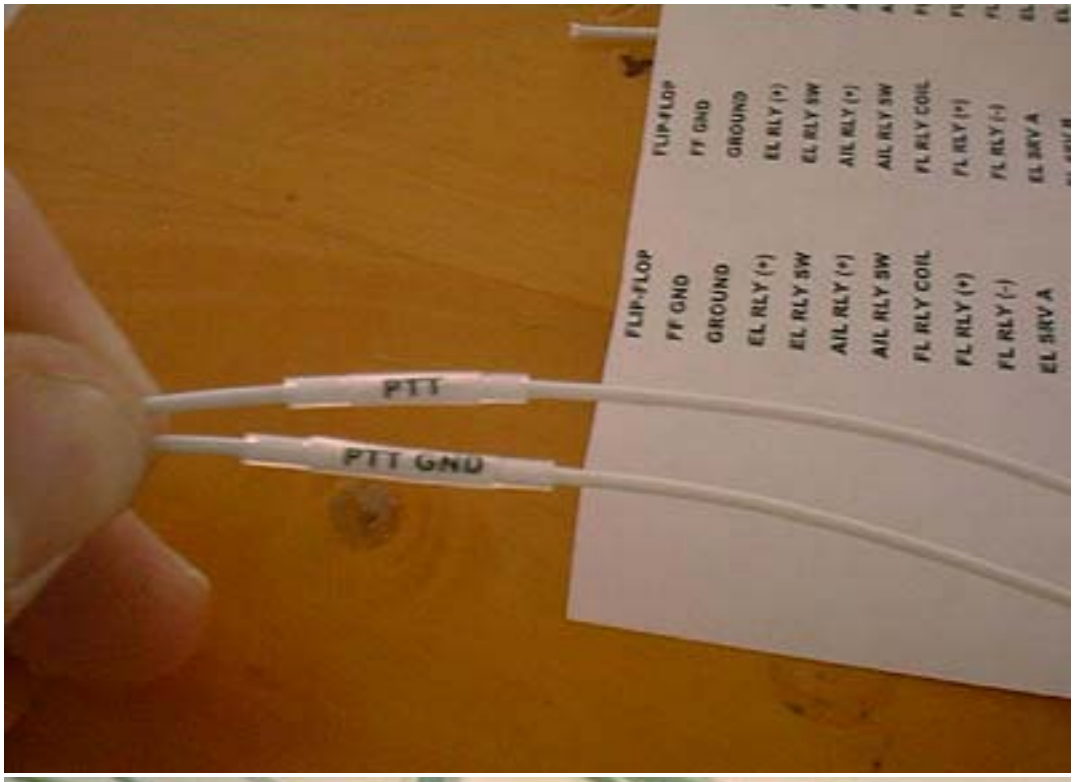
John R

BUILDER'S UPDATE

WIRE IDENTIFICATION

BY BOB RINGER, HALIFAX, CANADA

To permanently label all wires during construction of your aircraft or when adding new radios, etc. type up the labels on your computer in a small font and slip them side a clear piece of heat shrink tube in a location where they will be visible and not removed during final connection of the wires. This will take a bit more time initially but will save many hours during final hook up. Once heat is applied the labels become permanent and will not fall off like masking tape, etc...



BUILDER'S UPDATE
ELEVATOR COUNTERWEIGHTS
BY BOB RINGER, HALIFAX, CANADA

Some builders are finding the elevator counterweights as called out in the plans are not heavy enough and have to add extgra weight to properly balance to 110%.

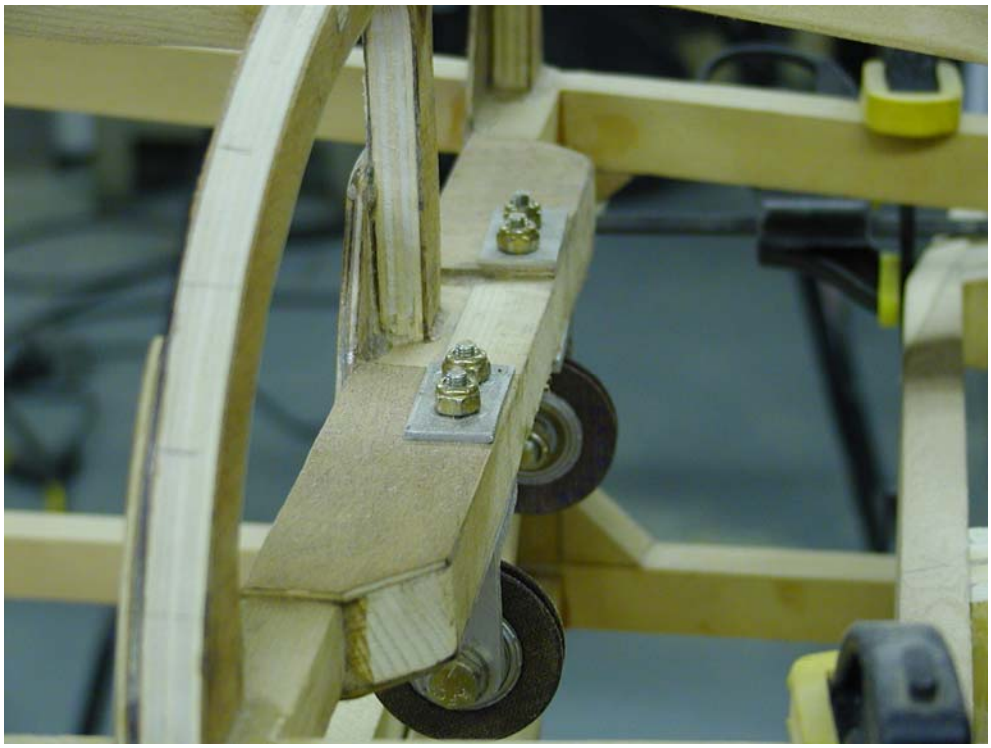
It is much easier to remove some weight with a drill than to add after the fact. With this in mind, I made the main weight 1 inch thick instead of the7/8" called for in the plans and added a second weight 3/8" thick at the rear of the wooden elevator horn support block. I based this additional weight on info I received from Jim Simmons who gave me an estimate of the weight required. Placing the additional lead behind the block has the added effect of off-setting some of the Torsional effect of the larger piece of lead attached to the front. I have tried placing the skins on the elevator and seem to be in the ball park for the correct amount of weight.

I built a mold out of a piece of metal with a wooden bottom and the sides 1" high. To make the smaller weight just scratch a ling on the inside of the mold and pour the lead up t o that line. I have fabricated my tips from balsa wood (had to glue some blocks together to get the pieces large enough) so I just hollowed out the ends of the tips so they slid on over the lead weights.

BUILDER'S UPDATE

RUDDER CABLE GUIDEPULLEYS, STATION 149 1/4

BY BOB RINGER, HALIFAX, CANADA



Due to the tight working area above the cross member at Station 149 1/4 and the top former it is nearly impossible to drill the four holes required to mount the two rudder cable guide pulleys. I even bought a 90 degree drill head and it would not fit. I took another piece of Stika spruce of the same size as the cross member and built the complete assembly on the work bench. I then glued this to the existing cross member and applied gussets top and bottom. It fit perfectly and the movement of the pulleys towards the rear gave me clearance for the cables over the stabilizer and also a clear run to the area below the baggage compartment. This method is quicker, more accurate and much, much easier.

BUILDER'S UPDATE

ELEVATOR IDLER ARM CUTOUT

BY BOB RINGER, HALIFAX, CANADA

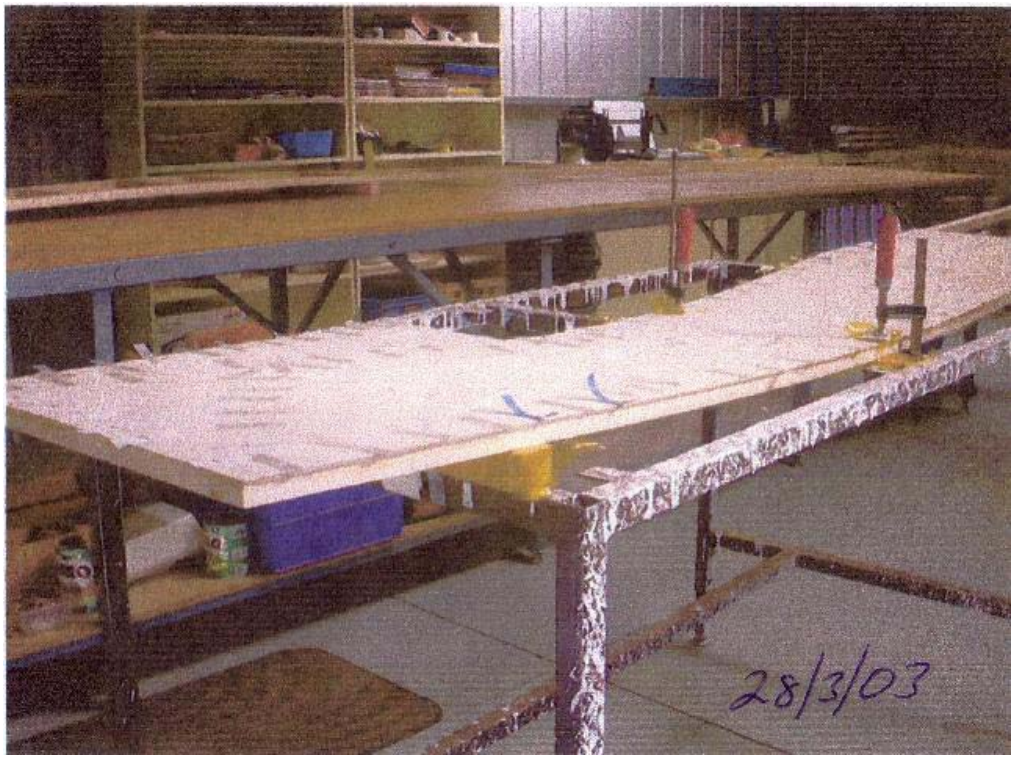
When installing the rear idler arm and clevis for the elevator push rod I found the rearward movement of the arm was hindered by the lateral lower cross member. Although it does not show on the plans it was necessary to cut out the center of the cross member to allow the arm to swing rearward sufficiently to obtain full up deflection of the elevators. This area' due to its size is very sturdy but builders may wish to install a cross brace on the rear of this Station in a position that would allow full travel of the elevators.

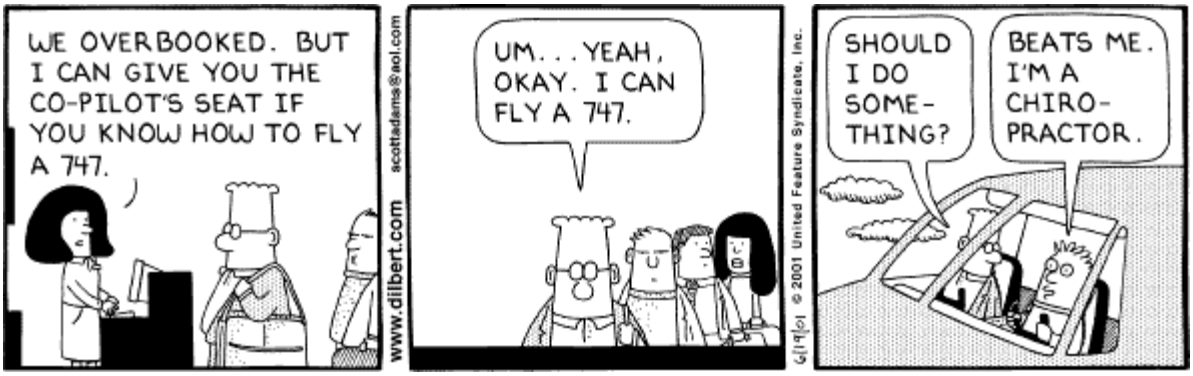
BUILDER'S UPDATE

ATTACHING FUSELAGE SKIN

BY ADRIAN MCCLELLAND, AUSTRALIA

Attaching inside fuselage skin, sta.0 to sta.78 . I was concerned that if the skin was glued to the fuselage side frames lying flat on the work table, it would make it more difficult to bend the fuselage sides to shape and that the ply would tend to "buckle". To overcome this, I glued the ply to to fuselage side frames with a bend build in. To achieve this, I used the steel frame of an old office desk. Lay the fuselage side over the desk and place blocks approx.2" thick under each end(near sta 0 and sta 78). Apply glue to the frame and ply. Place the ply onto the fuse. frame and pull the centre section down to the steel desk frame with clamps. This will give a bend for the fuse. sides which will be close to what will be required when constructing the fuselage. Staple the rest of the skin to the fuse. frame. When the glue has set, remove from the desk frame and your fuse. side will have a bend set into it, and the ply will be nice and smooth....no buckling! I used the desk frame so that I could see under the fuse side to check for glue squeeze out etc. If you do it on your workbench, it's a bit hard to clamp as the workbench it too wide to allow easy clamping.

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EARLIER THAT DAY
HI, JACK!

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