

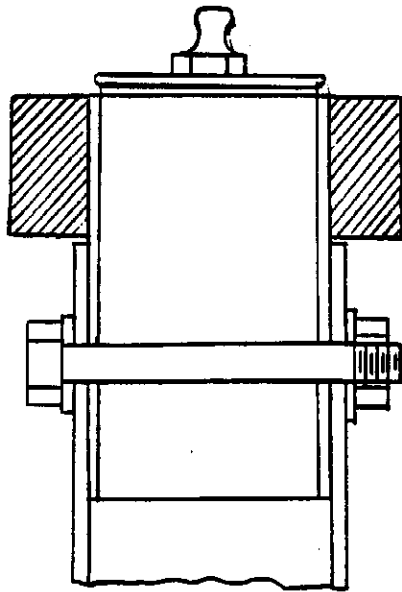
PAZMAN NEWSLETTER
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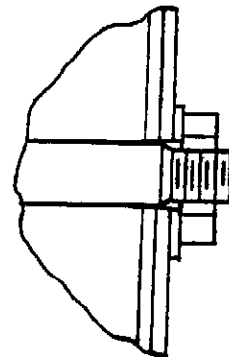
TIME FOR ISSUE 75! First of all, I confess that I still don't have N75PL flying yet, but I've received so much good information from you folks out there I just don't want to wait any longer before getting out another newsletter. By the way, since I am still endeavoring to get this out on at least a quarterly basis, let's consider this issue the Winter Issue for you northern hemisphere folks. I hesitated to call it that in the heading, since the winter season up here overlaps the end of one year and the start of the next and gets a bit confusing. Anyway, next issue will be Spring '86, in two or three months.

Meanwhile, let's get right on into things here with some words of wisdom from Paz himself:

First of all, a fellow builder, Warwick Greville of Broken Hill, New South Wales, Australia, wrote Paz to pass on his experiences with nose wheel shimmy - and correction of the problem - with his PL-2. In a previous letter to Paz Warwick indicated that the 3/16" AN bolts through the strut presented too small a bearing area and wore too rapidly, allowing the strut to shimmy. The suggested fix was to drill the strut out to 1/4" and install AN-4 hardware. Warwick, after some thought on this matter, replaced the AN bolts with NAS 1103-12 bolts. The NAS bolts are slightly longer, which means that the entire major diameter of the bolt is bearing on the hole through the strut; the AN-3 bolts were short enough that the taper at the top of the threads was in the hole, presenting a smaller bearing surface. On Warwick's PL-2, the original AN-3s started shimmying after only 30-40 hours, and since replacing this hardware with NAS, he has flown the aircraft for an additional 306 landings and four years with no recurrence of the problem. See the sketch below for clarification:



NAS-1103-12
INSTALLATION



AN-3
INSTALLATION

*Dear Paz - here's #75 To make your set complete. As I mentioned during our phone conversation, I should have the next issue (#80) out by the end of the year, w/ your pics. + story in your parts delivery to Argentina, plus lots of other info. And N75 PL should be flying in a week or so - annual has been completed, etc. For a few Fairings + inspection pencils as I write this. Breaks are MUCH better than the old system - I can now hold position w/ full power!
Happy Holidays - please let me know how your trip to Argentina comes out. Jack M.*

Actually, Warwick did not recall, but possibly the AN-3 bolts were worn, which would have contributed to the problem. In any case, if they were worn, there had to be some play there to cause them to wear - so the shimmy probably would have shown up sooner or later anyway. By the way, take a look at the photo section toward the back of the newsletter for some pictures of Warwick Greville's PL-2. Unfortunately, the black and white copies really don't do it justice; it really seems to be a beautiful PL.

As for my own N75PL, I've never experienced any nosewheel shimmy in the aircraft at all - and it has the standard AN-3 bolts in the nose gear assembly. I suspect that this is one area where the builder should be super precise and make sure the bolts are an exact fit through the holes in the strut, as well as long enough so that the threads are completely out of the hole. Everything here - scissors, attach bolts, etc., etc., should be an exact fit with no play. I've flown a lot of Cessnas, and it seems that they are especially prone to nosewheel shimmy - and no amount of playing with the shimmy dampener would help. Once the bolts and fittings start to wear, the wear pattern just keeps accelerating until shimmy will occur at lower and lower speeds. By the way, correct tire pressures are important on this, too. Too low a tire pressure will particularly tend to induce shimmy.

Pilot technique plays a big part in this too. In fairness to Cessna, most of their 150s, 152s, and a lot of their 172s are used for training, and a student is going to make more (and bigger) mistakes than a higher time pilot will. (at least, I hope this is the case!) From time to time, a student will wheelbarrow the airplane onto the runway, fly it on nosewheel first and porpoise down the runway, force the yoke forward on takeoff or rollout, etc. The greater the forces on the nosewheel and the faster the groundspeed, the more force there will be on all those attach bolts and attach points - and the faster they'll develop play and shimmy. Solution: Keep the nosewheel (and for that matter, all the wheels) off the ground as long as possible. Mr. Greville made a point in his reply to Paz supplying the above information on the NAS bolt fix that he did not feel that it was standard procedure to hold the nosewheel off as long as possible on landing. Well, this is true - unfortunately, it is not standard procedure. It should be, however. This is the way I teach my students to land, and try to land myself: Try to keep the wheels off the ground as long as possible. This insures the slowest possible airspeed (and therefore groundspeed) on touchdown, and less wear and tear on the gear. If one is landing on a rough surface (yes, I've been in and out of a few grass strips with the PL) this also saves wear and tear on the airframe, as less shock will be transmitted from the gear at lower speeds. As for the nosewheel slamming down as the airspeed drops further and the stabilator loses effectiveness, I find the effect is not that bad. There is relatively little weight on a PL nosewheel at rest, and even though the CG is rotating around the gear as the nose drops on rollout and transferring more weight forward, the stabilator is operating at a higher angle of attack as the tail comes up and develops more downforce to cushion that drop of the nosewheel onto the ground. So my personal technique is to try to hold the nosewheel off as long as possible

after landing. Whatever the answer is, I must be getting it right, as I've never experienced nosewheel shimmy in our PL-2. For those of you who might have experienced problems in this area, or want some additional insurance, Paz has approved the substitution of a 1/4" bolt for the original 3/16" AN-3.

Warwick also mentioned maintenance on the gear struts themselves - which is practically none. He flies out of a pretty dusty area, and uses much the same technique I do, which is to wipe down the chrome on the struts with a little gasoline from the sumps or other solvent to get the dust off before flying. This will also get rid of any residual hydraulic fluid which might cause dust to stick and eventually chew up the strut seals. At one time I thought I was going to have to overhaul all my struts due to slow deflation, but believe it or not, since hanging the aircraft I find that the problem has ceased! One wouldn't think that hanging an airplane would cure slowly deflating struts, but I theorize that while the airplane was tied down outside, even though I tried my best to get the tiedown ropes as tight as possible the airplane would still rock around a bit in the wind - which would of course more or less constantly exercise the struts. Any inflated strut, no matter how well it is built, will leak down faster if it is exercised constantly. Since putting the airplane in the hangar, I find that the struts stay at pretty much the same level, even with my climbing on the plane from time to time and rocking them around a bit. It's nowhere near the movement they were going through tied down in the wind 24 hours a day.

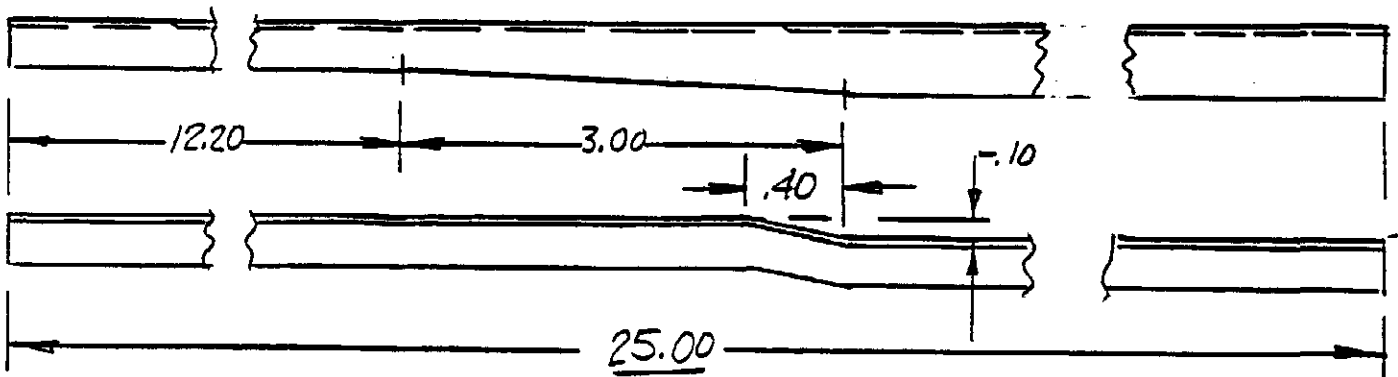
As far as inflating the struts goes, Warwick indicated a problem with rust after inflating them with air. He didn't say what his air source was, but obviously the problem is not the air, it's water vapor suspended in the air. Yes, I know that rust is iron oxide, but if the air is dry there will be no catalyst (water) to cause the reaction. I think that using a strut pump in a climate such as that (Broken Hill, Australia - pretty dry country) would not induce any moisture to speak of into the strut. However, using compressed air from a tank which may have been filled elsewhere might cause a problem. I have had a fair amount of air in my struts for the past two years now, and don't detect any rust that wasn't already there (one area on the nose strut apparently had the chrome pretty much machined away when it was ground down, and has a rust streak on it. Got to fix that some day.) I would prefer to use dry nitrogen to inflate struts, just to make sure there are no moisture/rust problems, but the place which is currently doing my annuals doesn't have it on hand, only a strut pump. Matter of fact, it is possible to purchase a small electric air pump for around \$30 here in the States which will supply sufficient pressure to inflate a strut - 200 lbs. max. Theoretically this is not quite sufficient when the aircraft is resting on the gear, but if you take the weight off the gear and inflate to about 180 psi, as I recall, you will end up with just about the right amount of pressure (and therefore strut travel) when the airplane is resting on the gear. These handy dandy pumps are intended for automotive use and have an adapter which plugs into the cigarette lighter receptacle on a car - or you could use the airplane's battery, I guess. These

pumps are pretty slow, but they get the job done if you don't have access to a small quantity of gas under sufficient pressure from any other source.

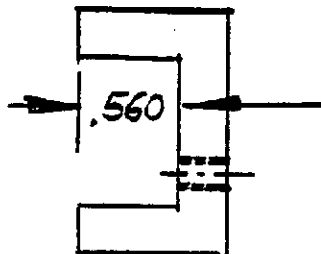
Warwick also mentioned his aerobatics with VH-PEW, and says he has a ball with it. He has pulled up to 5.25 G, but usually works between 4 and 5 Gs. Loops and slow rolls are entered at 120 kts, while barrel rolls are entered between 100 and 120. Note these speeds are in knots, not mph. And Warwick had not calibrated his airspeed system to date, so take these speeds with possibly a grain or two of salt. No, unfortunately I don't know what engine or fuel/oil system Warwick has in his PL-2. However, he says he generally works at about 4000 ft. and can hold altitude as long as he wants doing more or less continuous maneuvers. This is something I want to get into more, when I get the cowling hatch fixed so it will stay closed at high speeds/ high Gs! For those of you who want to try some acro with your PL, I'll make the same statement you'll see anywhere else here: **GET A GOOD, COMPETENT AEROBATIC INSTRUCTOR FIRST.** If you can find one familiar with the PL, so much the better; it would certainly be desirable to get your dual training in your own airplane, of course. Don't be afraid of breaking your PL; IF you built it properly and IF you fly it properly, it's solid as a rock. When I started work on removing the acro limitations on mine, I went up nice and high with a chute and pulled 6 Gs (6.2, to be exact, as I recall) just to make sure it would stay together. In fact I was trying to observe the wing at the time to note any oilcanning or excessive flexing; over a period of perhaps a second or so at this loading one can't be positive, but it looked just as solid as it does on the ground. If you want to see wing flex, take a look at a picture of a Cessna in flight from above; even in normal, 1 G flight the airfoil is a mess of ripples from root to tip. Now, think about pulling some Gs in it - or better yet, don't. No such problems with a well built PL!

Now, let's get on to some other developments. Paz has also sent along some plans changes for you folks out there, as follows:

DWG. 30-001-179 & -180 Angles:



DWG. 30-007, Sht. 2: -173 Stop -
Add this dimension:



Paz credits Duane Seymour with finding the above glitches - do you think there will someday be a time when the plans are perfect, Paz? It's nearly impossible to catch all these little omitted dimensions and etc., but if you come across any, please pass them on to Paz so he can correct them. We all seem to be perfectionists when it comes to PLs.

Paz has also received a goodly number of items from the estate of a PL-2 builder who recently passed away, and I have included this toward the back of the newsletter for any of you who might be interested. Contact Paz directly on this at the address on the newsletter heading.

BACK ISSUES: Thanks to the above named gentlemen, Mr. Pazmany and Mr. Seymour, I now have a complete set of back issues available. As I write this I have not yet attempted to copy these, and they may need retyping before I can make them available; I'll give it a try. There were a few of you who ordered all the back issues I had available at the time several months back, but my memory being what it is (or isn't), I'll ask you to get in touch with me again (postcard is fine) and I'll get the appropriate back issues off to you as soon as I can get good copies made. Same deal as always - \$1.00 per issue, and I'll delete these from your current subscription if you wish. Many of these back issues are smaller than currently, so less cost in copying and postage; it may work out even cheaper, depending on how many and which issues you need.

Getting back to PL nose gear assemblies (this really didn't fit in until now), Pete Karmouche wrote to ask about the use of centering springs for the nosewheel steering. Seems that he recalls seeing or hearing of someone who had installed such springs on a PL due to the airloads in flight on the nosewheel tending to keep the wheel cocked to one side or the other after applying rudder. I don't recall hearing of this - I've been through all the back newsletters, and maybe I missed it, but this is the first I recall hearing of it. Anyone out there know of this? As for N75PL, no, it has no springs in the nosewheel/rudder linkage. The natural tendency of the nosewheel is to caster straight at taxiing speeds on the ground, and of course this tendency is stronger as speed builds up - and at that point, airloads on the rudder tend to keep the assembly straight. In flight, airloads are relatively light compared to most factory builds (remember, this is a small airplane), but nevertheless there is enough airload on the rudder to center the assembly without the use of springs. I wonder if the person who installed

springs didn't have too much friction in the system for some reason, and installed the springs as a sort of "band-aid" fix. On my own personal PL, such a thing is certainly not necessary. However, it may be that this person wanted a cockpit adjustable trim system for his airplane; the springs, along with some method of adjusting tension on them, might work out well for this. I leave it to you builders out there as to the design of such a system; considering the light pressures on a PL, a cockpit adjustable rudder trim would really be overkill - at least on our little O-235 powered airplane. I have heard that the P factor on an O-320 PL is considerably greater, however, so such a system may be of some value there.

By the way, those nice pictures that Pete K. was so kind as to allow me to use in the last newsletter will be finding their way into Paz's book on landing gear design - vol. 2, according to Paz. Remember, folks, You Saw It Here First. Pete is now at work on pics of the fairings installed, and when he sends along those shots, I'll print them for you too.

And remember last issue, in which at the tail end I noted that one of our subscribers, Bob Bradley, had flown his PL-1? Well, Bob was kind enough to send an article from his local newspaper, the Reporter, about him and his PL; it's really a pretty good summation of the trials and tribulations of building a project like a PL, with no more than the usual number of misquotes and errors that seem to creep into such articles. (Of course, MY newsletter is perfect.) But Bob, you'll have to supply us with more information on those Corvair shock struts. Looks like General Motors kept the Corvair a secret for a long time, since according to the article these struts were out of a WWII model! You certainly did things the hard way; others have used Corsair struts instead! All kidding aside, it's still a pretty good article.

NEWSLETTER #76: Looks like I'll be getting another newsletter out in the near future (I hope). I have all kinds of news still left over for which I have no room this time around. For those of you who are interested in battery relocation due to O-320 installation, I have a nice collection of pictures from George and Tom Parrigin, the owners of the late Ken Arnold's N72KA. This airplane has a bigger engine and has had the battery relocated to the tailcone for proper CG location. In fact, my preliminary weight and balance calculations put the battery at exactly the same location if I do an engine swap in my PL - so it looks good to me. Also, I've had several requests to print my mailing list, and since I've heard no one object to this so far, if I have room I'll print it out so you folks can get in touch with each other directly. I know many of you would like to correspond with a nearby builder, etc; maybe this will help out. And I came across some info at EAA on PL-1/2 accidents; this is a very incomplete list, but it might be helpful to you to see what sort of problem areas there might be. Leigh Blake has also passed on some information on an aux. tank for an under - the - baggage - compartment installation; look for this in the next issue also. And I just may have some other goodies for you by the time I get the next issue out - keep up the good work and keep 'em flying!

Teamwork helps get Bradley's dream airborne

By NASH ROBBINS

Robert W. Bradley has his own airplane. And when he says the plane is his own, he means it. The Marblehead built it from scratch over the past 23 years.

He is one of 5,000 people across America to build planes from scratch or kit. But even though Bradley has spent an estimated 5,000 hours and \$4,500 on the two-seater, he insists the efforts were not all his own.

"The best part of the whole experience was the friends, the people I met," he said. Everybody in the field was willing to talk to him, and they were often willing to do more than that. For instance, more than one engineer volunteered to analyze stress on the plane's wing joints, at the point where they can be removed for towing. Fred Schaefer Jr., who lived in Marblehead, did the work, and eventually spent two years on the project, searching out ways to improve the joint's design.

Or take Joe Anthony, who was at least three months ahead of Bradley on his own version of the same plane. The two began corresponding, and eventually Bradley flew out to meet him and flew the plane when it was finished. "I took it through stalls and everything," said Bradley. "It was very sensitive, effortless."

And then there were his neighbors, most of whom helped hold parts at one time or another, since until three weeks ago the plane was in Bradley's backyard. After the plane was moved to its current site at Beverly Airport, Bradley had little hope of getting his plane's wings back on. But five flying buffs noticed his predicament, and spent 2½ hours replacing them, just to be helpful.

mild shrug, "I did it for the EAA."

Bradley, who is president of the West Shore Laboratories and an industrial conceptual and design engineering consultant, began work on the plane because he thought it would teach him something about metallurgy, the study of how metal reacts under heat or pressure. His hobby did that, he said, and more. Several techniques he developed during the construction, such as a method of placing rivets precisely while leaving a strong bond and flat surface, found their way into industry.

"It seemed like I would learn some technique to do one thing, and when that was done I wouldn't use it again. I'd have to learn something new," he said.

But Bradley, who learned to fly after beginning work on the plane, admits the experience has taught him more than a few industrial techniques. "Flying really builds your confidence in yourself. It's not true, what they say about if you can fly, you can do anything. But it does build your confidence for everything else you do," he said. Besides, he does enjoy it.

The plane

The plane is a PL-1, designed by Ladislao Pazmany. Bradley chose it after about two years of research, settling on the PL-1 because he said it is designed with safety, rather than speed or distance, in mind. The body is made of aluminum, and in a crash, will break outward. The gas tanks are on the ends of the wings, away from the cockpit, and have a 34-gallon capacity, enough to fly four to six hours without refueling. The construction is "military," meaning very strong, and the

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COCKPIT EXAM — Robert W. Bradley examines the cockpit of the PL-1 he has spent 23 years building. The plane has space for two people, and can fly four to six hours without refueling. (Photo by Nash Robbins)

But of all the people who helped him, Bradley had the kindest words for his wife, Margaret. "She was always supportive," he said. "She always came out with a glass of lemonade, and she was always the extra pair of hands needed during the construction."

Bradley shares the same selfless enthusiasm for fellow plane builders. Newer members of the Experimental Aircraft Association (EAA) have approached him with questions — he has published two articles about specific techniques he used in building his plane — and

he willingly spent time helping them out. Once, he bought \$10,000 worth of hard-to-find rivets, and offered them through magazines at 25 cents each.

Between the cost of buying them and effort needed to mail them out, he lost money, but, he said with a



READY TO FLY — Robert W. Bradley has spent 23 years building a PL-1 airplane with the help of his wife, Margaret. The two seater should be ready to take to the skies on June 15, when it will be tested for the first time.

(Photo by Nash Robbins)

MAR 68

After 23 years, he's ready to fly

Continued from Page 1a
plane can land in fields as short as 50 feet.

Bradley added a few items of his own, as well. The wings, for instance, can be removed so that the plane can be transported. A 42-inch stainless steel muffler makes the plane only about as noisy as a car, and joints sealed with epoxy and mandrel blind rivets are especially strong.

Even the radio required some work. The electrical field it generates would disrupt the plane's compass, so after some experimentation, Bradley placed three magnets behind it, to nullify its effects.

Finding the parts for his plane was not always easy. The engine and propeller came from Virginia, the blister for the canopy from Cali-

fornia, parts of the radio from Chicago, pieces for the lights from Canada. The shock absorbers caused real problems, though. He used the rear struts from World War II Corvairs, and the only ones available were in Australia.

But it's all together now, and almost ready for its test flight, June 15. Robert Andrews, a certified flight instructor Bradley met while eating breakfast at the Driftwood in Marblehead, volunteered to take the plane up for the first time.

Bradley couldn't say exactly what time it will be and how long it will take. The process, he explained, is a long one, since the plane is taken through a series of tests which become progressively harder, from taxiing, to short hops, to longer cruises. Not even his friends will witness the historic

flight. "I've got about 50 people mad at me, because I can't invite them out to see it," he said.

— But Bradley expressed little excitement over the prospect of flying the product of 23 years' work. "People ask, 'aren't you excited,' and I tell them Maggie and I will be excited the day we pay off our mortgage," he said. *AND 1964!*

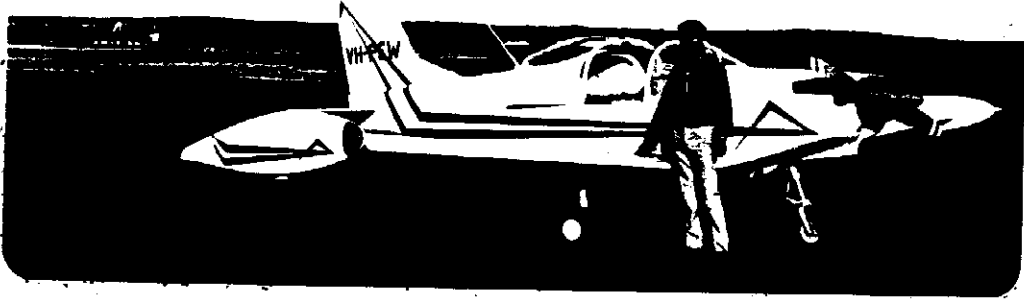
Once it's tested, Bradley expects to fly his plane for 50 or 100 hours — he currently has about 300 hours of flight time under his belt — before selling it. A new PL-1 would cost from \$10,000 to \$20,000, but he didn't have that in mind when he started the project. Instead, he wanted to learn, and enjoy himself. And he did.

"It was very difficult," he said. "but it was worth it."

PAZMANY AIRCRAFT CORPORATION
P. O. BOX 80051 - SAN DIEGO, CALIF. 92138



WARWICK GREVILLE - Broken Hill - AUSTRALIA



1ST FLIGHT - MAY - 1982



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PL-2 COMPONENTS PRICES

Jan. 1986

VERTICAL FIN - Complete with cap. zincromated	\$ 400 ⁰⁰
RUDDER - " " " " "	250 ⁰⁰
STABILATOR - " " " " & mass balance	800 ⁰⁰
2AILERONS - " " " " " "	800 ⁰⁰
ENGINE MOUNT - LYCOMING	500 ⁰⁰
2 FUEL TANKS - Assembled. with fuel lines - fittings.	1200 ⁰⁰
WINDSHIELD & CANOPY FRAME. Fiberglass. untrimmed	350 ⁰⁰
3 LANDING GEAR SHOCKS. All parts except piston tubes - include: axles, fork, steering - brace to attach nose gear to mount	1500 ⁰⁰
* 2 SETS SPAR CAP EXTRUSIONS. Taper milled, bent.	each set → 1200 ⁰⁰
1 SET FUSELAGE EXTRUSIONS - Very slight corrosion.	400 ⁰⁰
1 SET WING RIBS. (less aileron ribs) - Channels, angles - (stems complete - Bare aluminum. need alodine & zincromate -	1000 ⁰⁰
1 CONTROL STICK ASSY -	500 ⁰⁰
3 PIECES PLEXIGLASS TINTED. Windshield. + 2 canopy sides. Gummed. Need a lot of cleaning. Windshield has a 6 in. crack at bottom edge. may not be in the useful area. All untrimmed. Heat Formed	50 ⁰⁰
* 3 ALUMINUM PROPELLER SPINNER (spooned). untrimmed	\$ 50/ea.
1 SHEET ALUM. 2024-T3 - .025 slight corrosion	\$ 50
1 " " " - "O" - .025	\$ 50
2 TIRES 5.00-5 Good-Year (for tube)	\$ 50
TOTAL	
	<u>\$ 10,450</u>

* Only one set is reqd. per airplane.