PAZMANY NEWSLETTER
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HAPPY NEW YEAR! At the moment, I am in the midst of keeping one of my new years' resolutions - namely, to get out another PL newsletter before you all give up hope and assume I skipped the country with your subscription money. Actually, I haven't acquired a lot of news for you since the last issue, but nevertheless I'd like to use this issue as a sort of "wrap up" for a lot of still pending correspondence from you - particularly in the form of items to sell / buy / swap / etc., but of course any other correspondence as well.

First of all, I'll start with a recap of newsletter basic info. In issue #77 (last issue) I hinted that your faithful (if a bit slow) newsletter editor might have a new address in the near future. Sad to say, this did not come to pass, so you may continue to write to me at the address in the heading of this issue, which is the same as it has been for the past several years. As for the newsletter, yes, all back issues are now available, thanks to several of your fellow subscribers who managed to supply me with copies to copy(?) and supply to the rest of you. The rate for these back issues is somewhat variable (in other words, I make it up as I go along), due to most of the earlier issues being much smaller than the ones of the last several years, and also depending on the number ordered - it's of course cheaper per issue to pay postage on a whole bunch of the things than on one or two. Anyway, the rate will be no more than the current $1.00 per issue, and will in all likelihood be less, especially if you're in need of issues earlier than (approximately) #50, say. Let me know, and I'll send them off to you and deduct the cost of copies and mailing from your future paid subscription and/or let you know if you still owe a bit. If you would like a significant number of back issues and don't have a great deal in the account, please send additional funds; the newsletter account can't float a great number of mailings of back issues. Other than that, anything goes.

So, let's tackle the correspondence in (roughly) chronological order. Way back in July, PAZ informed me that he still has a goodly number of PL-2 parts, materials and assemblies available from a builder's project, and is willing to give a buyer a pretty good price break on these items. Also, Paz passed along an order form for his new book, ***LANDING GEAR DESIGN FOR LIGHT AIRCRAFT***, vol. I. I've seen EAA's advance copy of this book, and I'll tell you, it's the most thorough treatise on the subject by far that I've ever seen - and this is just the first of two volumes! My check for my copy is going in when I send Paz his newsletter. See the next few pages for the ordering info and the parts and price list for the parts Paz has available, as well as the reviews of the book from *SPORT AVIATION* and *KITPLANES*.

Finally got another issue out - I not only enclosed the word on your ldg. gear book, but also a check for same - and of course keep me posted on availability of Vol. II! Also included your sketches on weldments to clear a spin-on filter on a 4 cyc. O-320. Looks good for those still building, but there must be an angle adapter available somewhere for those of us who are already flying. - Jack M.

SportAviation
EAA . . . THE SPORT AVIATION ASSOCIATION
JUNE 1986 | VOL 35, NO. 6

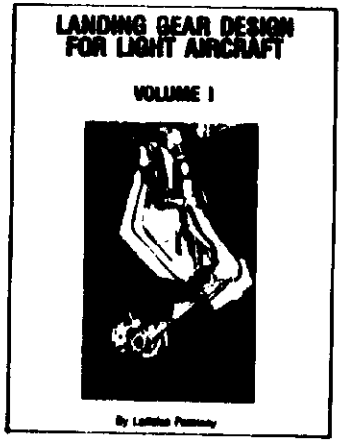
LANDING GEAR DESIGN

It may sound trite, but Ladislao Pazmany has, in fact, written a 2-volume treatise that quite literally contains everything you could possibly want to know about landing gears. The research that went into this project is nothing short of monumental — it took Paz ten years to complete! Historical as well as technical, it starts with a foot launched hang glider's landing gear, moves on to the skids under the Wright flyer and progresses ultimately to the latest homebuilt and factory landing gear installations. It's all there, the history, the theory, the math, the actual hardware of every type of landing gear ever used and written about. Volume I, which has just been printed, contains Chapters on landing gear arrangement, the ground loop, tires, wheels, brakes, brake systems, loads and deflections, main, nose and tail gears. Profusely illustrated with photographs and drawings (many by Paz, himself), the book is of value to everyone from aviation history buffs to aeronautical engineers actually involved in design work. Highly recommended.

Volume I is available now in the U. S. for $26.00 (includes $1.00 for mailing) and $30.00 elsewhere. Order from Pazmany Aircraft Corporation, P. O. Box 80051, San Diego, CA 92138.

Volume II, which will be available in about a year, will cover landing gears for sailplanes and motorgliders, floats and skis, retraction, stress analysis, weights, shock absorber design, materials and patents.

KITPLANES
August 1986—Vol. 3, No. 8



LANDING GEAR DESIGN FOR LIGHT AIRCRAFT, VOLUME I

By Ladislao Pazmany; published by Pazmany Aircraft Corp., P.O. Box 80051, San Diego, CA 92138; softcover, 245 pages, photos, drawings, tables; $25.

Aircraft designer Pazmany has a reputation for thoroughness in whatever he does, and his latest book does nothing to tarnish his image. Beginning with the original aircraft landing gear (human legs) and carrying on with every conceivable form of light aircraft gear arrangement, *Landing Gear Design for Light Aircraft* is a treasury of information.

A chapter on the geometry of landing gear lays the groundwork for anyone designing an airplane or a glider. Particular attention is paid to propeller ground clearance, taking into account combinations of flat tires and compressed struts or legs. Tables and simple formulae are presented to determine the stability of castering nosewheels. The various arrangements of sailplane landing gear including skiplates, tip wheels and even tandem gear (as found on the Rutan Solitaire motorglider) are explored. The chapter on gear geometry concludes with a pro-and-con comparison of the four main gear configurations: tailwheel, nosewheel, single wheel and tandem wheel.

Factors affecting groundloop tendency are discussed thoroughly. A section on aircraft tires is the most comprehensive I've seen on the subject. Topics include tire construction, forces on a tire, basic types, FAA regulations, tire performance curves and engineering data on all the commonly used FAA-approved light airplane tires *plus* many uncertificated tires used on Experimental homebuilt aircraft. Even the oddball tires are covered. These include the spherical tires used none too successfully on the 1934 German Klemm KL-26 light airplane.

Wheels (beginning with wire-spoked types) and brakes (both primitive and state-of-the-art) are covered thoroughly. A lengthy chapter on landing gear loads and deflections will help a designer determine strength requirements. Especially complete is the section on gliders including such imponderables as landing against an obstacle (a tree is illustrated) and the load on a tailwheel of an empty glider which is accidentally dropped onto the ramp from maximum height.

Without a clue which Pazmany thoughtfully provides in his preface, I would have been hard pressed to guess what is left to cover in Volume II of this book, which he says will be published in about one year. Volume II will include more details on gears for gliders and motorgliders, floats, skis, more on retraction, plus weights, shock absorber design, materials and patents. In the meantime, Volume I is not exactly entertainment reading, but it should be a valuable addition to any light aircraft designer's library. *—Dave Martin.*

San Diego, California

May 1986

Dear Aviation Enthusiast:

I am pleased to announce the publication of my book "Landing Gear Design for Light Aircraft" - Volume I.

This book, intended originally as a chapter in a revised version of my "Light Airplane Design" book (published in 1957), is a compilation of data spanning more than a decade in time. In the course of my designs of landing gears for light airplanes, a broad spectrum of characteristics, performance, arrangements and related subjects were examined, evaluated and added to what would, in the space of 10 years, assume book-length proportion.

Volume I, now available, covers: Arrangement of the Landing Gear, The Ground Loop, Tires, Wheels, Brakes, Wheels and Brakes without TSO, Brake Systems, Loads and Deflections, Main Gears, Nose Gears, Tail Gears. The book has 245 pages, 463 illustrations (113 photographs and 350 line drawings), 32 tables and 3 large fold-out drawings. A reproduction of the Index in the back of this page will give you a more detailed idea of the subjects covered.

Volume II, scheduled to follow within approximately one year, will cover: Landing Gears for Sailplanes and Motorgliders, Floats and Skis, Retraction mechanisms, Steering, Shimmy, Fairings and Doors, Testing, Trade-offs, Stress Analysis, Weights, Shock Absorber Design, Materials, and the reproduction of the front page and an abstract of over 500 USA patents related to Landing Gears.

The price of Volume I is $25.00. Please add the following postage and handling expenses:

USA	- Book Rate	-	USA $ 1.00
USA	- Air Parcel	-	3.00
Canada and Mexico	- Book Rate	-	2.00
Canada and Mexico	- Air Parcel	-	4.00
Europe	- Book Rate	-	2.00
Europe	- Air Parcel	-	9.00
Africa, Asia, Australia, Japan	- Book Rate	-	2.00
Africa, Asia, Australia, Japan	- Air Parcel	-	13.00
South America	- Book Rate	-	2.00
South America	- Air Parcel	-	9.00
Central America	- Book Rate	-	2.00
Central America	- Air Parcel	-	6.00

California buyers, please add $1.50 sales tax.

LANDING GEAR DESIGN FOR LIGHT AIRCRAFT

Supported by over 40 years of diversified aircraft design experience, Ladislao Pazmany has successfully gathered all elements of airplane landing gear design into one book. The presentation of this broad spectrum of basic data in a single, well illustrated reference source will prove invaluable to aircraft designers, homebuilders, engineering students, pilots and mechanics interested in the how and why of their aircraft, and the many readers who follow airplane development history and progress.

As a designer, I can testify to the great convenience of having tire deflection and load data, structural calculation procedures, reference retraction systems and gear design configurations, brake and pedal system schematics, details of many different landing gear assemblies, and comparative landing gear design data all in one place.

While it may be true that the landing gear is "unnecessary baggage" during flight, it is more correct to consider properly designed and easily managed landing gear installation as being essential for proper operation and popular acceptance of any landplane or amphibian. In preparing LANDING GEAR DESIGN FOR LIGHT AIRCRAFT, Ladislao Pazmany has made a valuable and most useful contribution to the field of airplane design literature. As such, this book is highly recommended reading for anyone seriously interested in light aircraft.

David B. Thurston
President, Thurston Aircraft Corporation

Landing Gear Design for Light Aircraft is a great compendium of information covering tires, wheels, brakes, and landing gears. This should be a tremendous assistance to anyone designing and building a new light airplane. Any home-builder would be well-advised to use data provided in this book.

E. J. Swearingen
President, Swearingen Aircraft Corporation

ORDERING FORM

Pazmany Aircraft Corporation
P. O. Box 80051
San Diego CA 92138

Please send me one (1) copy of your book LANDING GEAR DESIGN FOR LIGHT AIRCRAFT - Volume I. Enclosed is my check ( ), money order ( ) for $_____ to cover the price of the book, postage, handling and $1.50 sales tax (California residents only).

PLEASE TYPE OR PRINT

NAME: _____

STREET: _____ APT. _____

CITY: _____ STATE: _____

ZIP CODE _____ COUNTRY: _____

Book Rate (surface mail)_____ Air Parcel _____

PL-2 COMPONENTS PRICES Oct. ~~July~~ 1986

VERTICAL FIN - Complete with cap. zinchromated —	150 $	~~300~~
RUDDER — " " " " —	100	~~200~~
STABILATOR — " " " " & mass balance	300	~~600~~
2 AILERONS — " " " " " "	250	~~500~~
ENGINE MOUNT - LYCOMING	200	~~400~~
2 FUEL TANKS - Assembled with fuel lines - fittings.	500	~~1000~~
WINDSHIELD & CANOPY FRAME. Fiberglass. untrimmed	150	~~300~~
3 LANDING GEAR STRUTS. All parts except piston tubes - include: axles, fork, steering - brace to attach nose gear to mount	600	~~1200~~
* 2 SETS SPAR CAP EXTRUSIONS - Taper milled, bent. $ 500 ea	each set	~~1000~~ 500
1 SET FUSELAGE EXTRUSIONS - Very slight corrosion.	150	~~300~~
1 SET WING RIBS. (less aileron ribs) - Channels, angles - (seems complete - Bare aluminum need alodine & zinchromate -	500	~~1000~~
1 CONTROL STICK ASSY -	200	~~400~~
~~3 PIECES PLEXIGLASS TINTED - Windshield. 1-2 canopy sides. Grooved - 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~~	SOLD	~~1200~~
* 3 ALUMINUM PROPELLER SPINNER (grooved) - untrimmed	25 ea	$ ~~50~~/ea.
1 SHEET ALUM. 2024-T3 - .025 slight corrosion	25 ea	$ ~~50~~
1 " " " - "C" - .025	25 ea	$ ~~50~~
2 TIRES 5.00-5 Good-Year (for tube)	25 ea	$ ~~50~~
TOTAL	$	~~7.400~~ 3.700 ea

* Only one set is reqd. per airplane.

These PL-2 components belonged to a local aero-engineer/builder who died some 6 months ago. The family asked me to help selling these parts. Prices are negotiable.

L. Pazmany

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

Meanwhile, onward and upward (or whatever) to other info. Way back in the summer of last year, **DUANE SEYMOUR** wrote to ask how others are bending the tubing for the windshield and canopy arches. Well, I'll tell you, Duane, I haven't heard of a better method than the one you suggested in your letter, so I'm going to pass it on to everyone else. If anyone has an even better method (and I suspect that would take some doing), let me know and I'll pass it along. Duane bought an electricians' 1/2 inch electrical conduit bender to do the work, and this, along with a plywood template, did the job. Duane says he'd bend a little, compare the tube to the template, bend a little more, etc. These tubing benders are not real expensive, I know, but if you can borrow one from a friend of a friend or whatever that would probably be best, unless you're planning to use it for other jobs, since there are only a couple pieces of tubing to bend in a PL-1/-2.

PETE KARMOUCHE has a few things to pass along also - starting with a discovery about spin on oil filters, adapters, Lycoming O-320 engines, PL-2 nose gear struts, and the principle about no two objects occupying the same space at the same time. **PAZ** was kind enough to do some engineering on this problem, and came up with a fix which is reasonably easy to do, if you don't mind a little welding. See the next page for the "how-to" drawing on this - and thanks, Pete, for passing this along. There are more and more builders opting for O-320s of various types, and when I move up to such an engine I'll want a full filter for it also.

This brings up another point: **DUANE SEYMOUR,** in another letter, asked about essentially the same thing - but attacked the problem from a different angle. Duane initially considered lengthening his engine mount bolts to move the engine about an inch forward to allow room for the filter, but as an engineer friend of his pointed out, this is **NOT** the way to go. I ran into a similar problem when trying to attach my new Cessna rudder pedal assembly (on which the cables attach to arms in the center of the torque tubes) to the PL cables on the sides of the cockpit. The problem is that these bolts are designed mainly to take shear and tension loads, and any extension of the load on an arm will create a bending load also - which would require a considerably larger bolt, not to mention a beefup of the attach points, etc. Duane and Paz also suggested a remote filter installation, with an adapter on the back of the engine with perhaps a couple right angle fittings on it. Unfortunately, here's where everything came to a halt: No one seems to know of such hardware for an O-320, although I'm sure some such thing must exist. Anyone out there know of such a thing? Anybody ever remote mount a spin on filter on their PL? If anyone out here can help out, please pass the word to me and I'll put it in the next newsletter. Duane is also looking for a set of templates for cooling baffles for his O-320 installation. Can any of you with O-320s on your PLs help Duane out? He'll trade you a set of his battery box templates for the baffle templates. Contact Duane at 210 Rue Grand, Lake St. Louis, MO 63367. One last thing: Have any of you installed oil coolers on your PLs? Duane (and me, too) would love some info on mounting location, plumbing, etc. - it can go in the next issue.

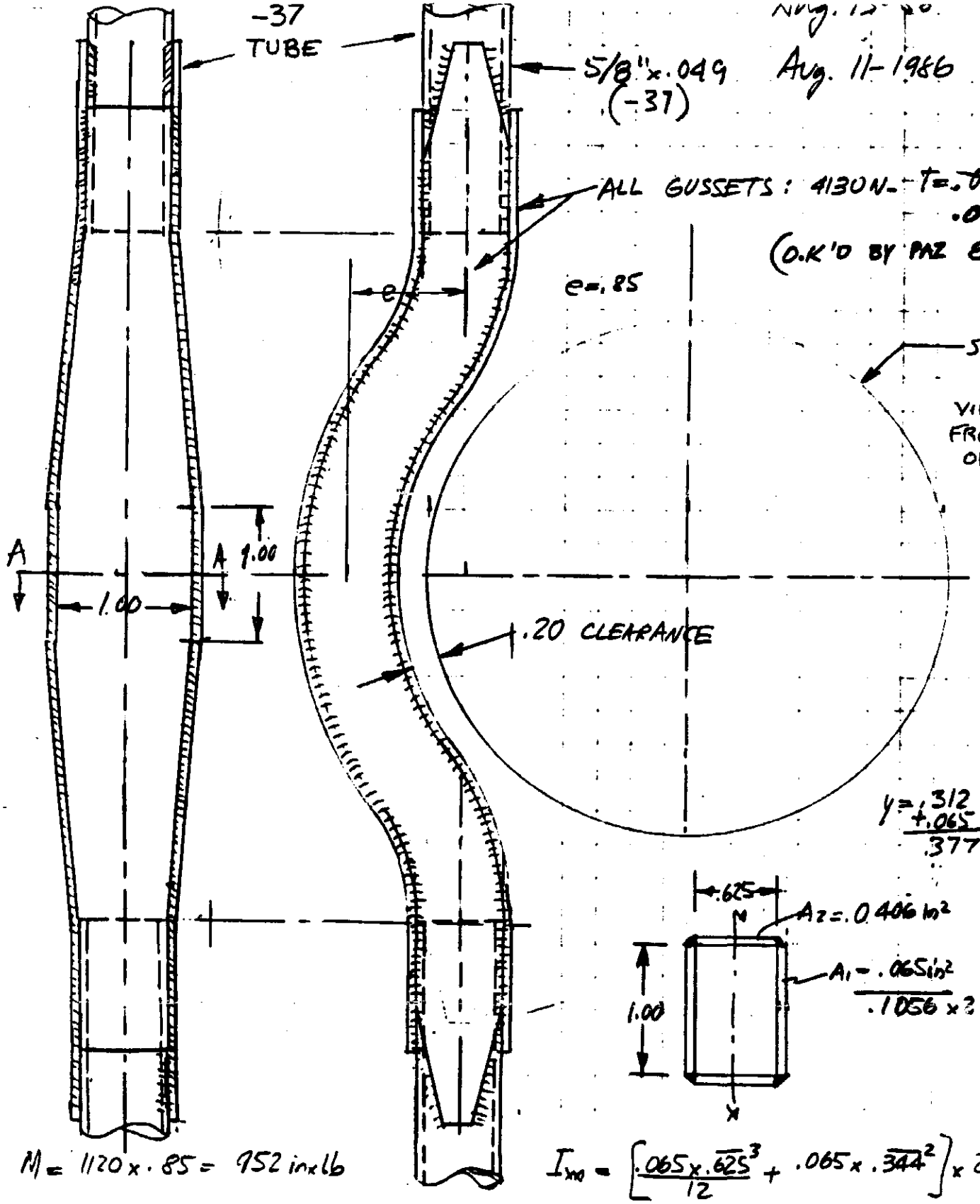
-37 TUBE

5/8" x .049 (-37)

Aug. 11-1986

ALL GUSSETS: 4130N - T=~~.065~~ .063

(O.K'D BY PAZ 8-27-86)



$y = .312 + .065 = .377$

$A_2 = .0406\ in^2$

$A_1 = .065\ in^2$

$.1056 \times 2 = .2112\ in^2$

$M = 1120 \times .85 = 952\ in\cdot lb$

$I_{xx} = \left[\frac{.065 \times .625^3}{12} + .065 \times .344^2\right] \times 2$

$= (.001322 + .00769) \times 2 = .018\ in^4$

$f = \frac{1120\ lb}{.2112\ in^2} + \frac{952\ in\cdot lb \times .377}{.0184}$

$5303 + 19505 = 24{,}808\ psi$

$M.S. = \frac{70{,}000}{24{,}808} - 1 = 1.82$ OK

Getting back to **Pete K.** again, let's cover the rest of his letter. Pete has run into the age old problem of annealing Plexiglass. Now, I know practically nothing about this subject, being as how the builder of the aircraft purchased a commercially made Plexiglass kit - from Rattray, I believe, or else Gee Bee Canopies. What was done as far as annealing the plastic before and after the cementing process, if anything, I don't know. Rohm and Hass, who more or less invented Plexiglass (at least they own the trademark - call it acrylic and they won't sue you), advise annealing for 24 hours at 187 degrees F. They skipped over the minor detail of how to accomplish this, however. I have heard of builders getting chummy with the manager of the local pizza palace and using one of their ovens after hours for various heat treatment projects, but it's doubtful that you'd find an oven tall enough to get the entire canopy into, and besides, who'd want one of their commercial ovens tied up for 24 hours?

How about building your own oven? This might not be as bad as you think. Just thinking about it, I believe I'd try building a 1/2 inch or thereabouts plywood, waferboard, or some cheap material box. Since the temperature is relatively low, a plain old wood box should do fine. Then by ducting a space heater of some sort into it (I envision one of these kerosene things that looks like a jet engine on wheels) one should be able to come up with enough heat to do it. You guys in the southland might have problems coming up with a heater which will do the job at your local hardware store, but up here in Wisconsin, no problem. The problem, as I see it, will be to control the temperature properly and to heat the material evenly and avoid hot (or cold) spots. Another possibility so as to avoid the hot spot problem might be to use water as the heat transfer medium, if the cement will take the water immersion. Line that box with plastic sheet and use an immersion type heater. I recall that the Army had some dandy heaters that they used to heat the water in 32 gal. cans for washing eating utensils and etc. in the field, but I don't pull much KP any more, so I don't know where you'd find such a thing. Well, I came up with the basic idea; you guys can refine it.

Pete is also planning on the installation of a stall warning device on his PL, of the vane type. You've all seen the ones, a small tab about 1/2" x 1/2" sticking out of the leading edge of the wing, free to move up and down roughly another 1/2", depending on how the relative wind strikes it. The question is, exactly where on the leading edge radius does one mount such a device on a PL-2? Ya got me, since I don't have a stall warning device on N75PL. If any of you have installed such a thing on your PL, please drop Pete a line with the appropriate info. Otherwise, the only suggestion I have is of course to go out to the airport and find a similarly shaped leading edge (older Piper Cherokees might be a start) and make some careful measurements. Bear in mind that you're not going to get it right on the first try unless you live much more cleanly than I do and your prayers have much more power than mine. Note that even on the factory builts that adjustment has been provided, since no two airplanes are ever exactly the same. And after working all that out at altitude in flight tests, it's all going to change during your landing flare in ground effect. Good luck!

Before we leave Pete K., I'll remind you that he still has a completed set of PL-2 wheel and strut fairings for sale. Pete built these up per order, and the buyer cancelled. If you can help Pete get rid of these and want to speed up your PL-2 by a goodly number of knots, contact Pete Karmouche at 9 Cranfield Ave., San Jose, CA 94070. Due to a maybe marginal cylinder and a forthcoming annual, I'm afraid I must decline, unfortunately.

Meanwhile, Pete's son **Paul** is now making the news - check out p. 9 of the Feb. '87 issue of ***SPORT AVIATION.*** Congratulations on that first solo, Paul! See article below.

YOUNG FACES IN AVIATION

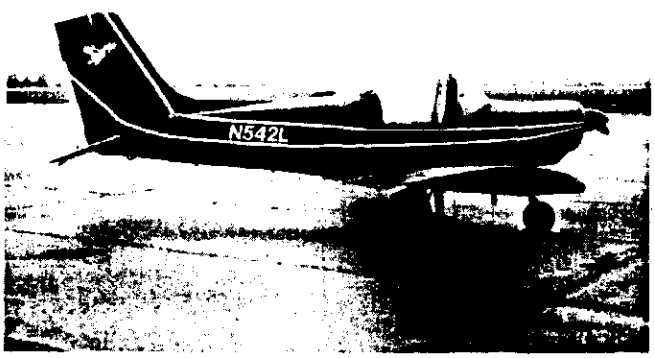
Young Faces in Aviation *recognizes the* notable achievements of EAA Junior Members (18 years old and younger) . . . soloing, building or restoring aircraft. Please include name, address, EAA Junior Membership number, date of solo, type(s) of aircraft flown, a color "head shot" (like a school photo) and any other pertinent data. Send photos and info to Young Faces in Aviation, Attn: Golda Cox, EAA, Wittman Airfield, Oshkosh, WI 54903-3086.

John W. Poynton (EAA 257248), 103 Minneola, Hinsdale, IL 60521 soloed a Cessna 152 last July 19 . . . his sixteenth birthday . . . at the DuPage County Airport in St. Charles, IL. He used the experience to *good advantage by writing a paper on it for* his English class. John is a 1985 graduate of the EAA Air Academy and wants to go on to become an Air Force fighter pilot . . . and perhaps, ultimately, an astronaut.

Paul A. Karmouche (EAA 276773), 9 Cranfield Ave., San Carlos, CA 94070 soloed a Cessna 152 on his sixteenth birthday, December 23, 1985. He earned his Private pilot's license on November 1, 1986 . . . and has subsequently been checked out in a Piper Archer II. Paul's other hobby is photography and he plans to combine interests by getting into aerial photography. Currently, he and his father, Pete Karmouche, are finishing up a Pazmany PL-2.

JOHN W. POYNTON

PAUL A. KARMOUCHE



PAZMANY PL-2 BY EDWARD BOOTH

Builder is Edward Boothe, Electronics Instructor, Airborne Navigation Equipment, Keesler AFB, Biloxi, MS 39534. The unique features of Edward's PL-2 include the lack of tip tanks; the airplane being converted to wet wings, which he believes is the only PL-I or PL-2 that's ever had the tanks removed. He says a significant improvement in handling and an increase in airspeed are very obvious. Edward is, of course, heavily into electronics, and if you will look closely, you will see a long ADF antenna, which runs from out of the cockpit almost to the tail on the bottom of the airplane.

And we also have pictures of not one, but TWO recently completed PLs! The one on the left is from a clipping from the Feb. '87 issue of the ***EAA TECHNICAL COUNSELOR NEWSLETTER,***

featuring **ED BOOTHE's** PL-2. How about a flight test report, Ed: I imagine everyone else is as interested as I am to know what the numbers are on the airplane without tip tanks. On the right is a picture sent by a new subscriber, **BILL RAKSANYI**, of his recently completed PL-1. You may not be able to tell from the way the picture copies, but I imagine Bill says the same of his PL as I say of mine: "Don't complain, it ain't finished yet!" But at least we have ours flying, right? And you'll probably have yours painted before I do, Bill. Bill's PL has a 150 hp. Lycoming for power, and with this he comes up with 130 mph cruise at 2450 RPM. You didn't mention altitude or whether IAS or TAS in your letter, Bill - but it looks like a great candidate for a set of wheel fairings. It's always nice to report on a newly completed and flying PL, and even nicer to report on two of them!

Speaking of completed PLs, if you might be in a bit of a hurry to own a flying PL, **Col. JACK TETRICK** has reluctantly put up his bird for sale. Being as how his hangar is filled to overflowing from the sound of it, what with PIK-20 sailplane, twin Comanche, and cars and other assorted ground vehicles, something's gotta go, and unfortunately, it's the poor PL. Jack's PL is one of the Taiwanese built PL-1B military trainers with 150 hp, so if any of you are looking for a quick, economical method of owning your own warbird, contact Jack at 1785 Doolittle Court, Daytona Beach, FL 32014. Phone 904-788-0679 eves, 904-761-1711 days. Oh, yes - price is $11,700.

LEE CONLAN of **Homebuilders Aircraft Associates** also dropped me a line to inform me that he still has the alternator, starter, and and pair of Goodyear disk brakes (disks only, I gather) for sale. The electrical goodies are for the later O-200 Continentals. If you're interested, contact Lee c/o HAA, 7858 Arnett St., Downey, CA 90241. Phone 213-869-0536. By the way, Lee also informs me that sad to say, he is wrapping up his PL parts business. As he says, the PL parts business is slowing down; the design has been around for 25 years now, believe it or not. Lee just might have some deals on remaining parts, so contact him if there's something you need.

And finally: **LEIGH BLAKE** has a few questions which with a little luck, I can squeeze in here. First: What about an oil cooler on the O-290 installation? Personally, I could use one on my O-235, but the main reason for that is the crossover exhaust system which passes just inside the nosebowl, right in front of the oil sump. I strongly suspect that with any other type of exhaust system there wouldn't be nearly so much of a problem with oil temp. Anyone else have some thoughts on this? Second: Fresh air vents. Personally, I like the location and convenience of the standard PL vents just fine, although I find them slightly awkward to open and close with the round "screw the knob in and out" arrangement. I went a long way toward making this easier by grinding some "dimples" around the edges of the otherwise smooth round knobs to make them easier to turn. Otherwise, with some judicious weatherstripping, no, they don't leak when closed and have presented no problems. I find them quite effective when open, too; I suspect more so than say, a NACA type vent.

Well, out of room for #78; time to get this off to the copiers. Keep 'em going, guys - it's well worth it! - *J.M.*

[redacted]

Ladislao Pazmany
P.O. Box 80051
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Your last issue is #N/A