

Pulsar News

News, Updates, and Developments for Pulsar Builders and Owners

Issue No. 1

Published by the Pulsar Builders' Association

November, 1989

OPENING COMMENT:

Greetings fellow Pulsar builders! This is the first of what I hope will be many expanded newsletters devoted to Pulsar builders and owners. As some of you are already aware, Oshkosh '89 gave birth to the idea of an expanded Pulsar newsletter which would encourage communication among Pulsar owners as well as from Mark Brown. The net result of those ideas will hopefully benefit everyone.

What's critical to the success of our newsletter is builder input. I encourage everyone to submit their hints, suggestions, updates, photos, progress reports, etc. so that we can make them a part of the newsletters. I'll route all builder suggestions which deviate from the builder's manual to Mark for his review prior to publishing them, but please send them to me with enough lead-time so they can be included in the next issue of the newsletter.

Lastly, I sincerely encourage all suggestions for improvement to the newsletter. Within the time and monetary constraints, I'd like to make the newsletter as beneficial as possible to everyone. Please be patient with me and I'll try to do the best possible.

SUBSCRIPTIONS:

As Mark noted in his last newsletter, everyone is asked to send in their \$10/year to cover the costs of the newsletter. Given his experience with the newsletter, Mark felt that the \$10 would cover everything. Since the \$10 will offset the printing and mailing expenses, nobody will get rich (too bad for me!), but I do ask that everyone who hasn't sent in their money please do so and send it to the Glen Ellyn address shown herein. Thanks.

FOR SALE:

Keith Claypool has asked me to note that his Pulsar kit is for sale (due to medical reasons). The fuselage has been completed and is on the main gear. The wing and engine kits remain to be finished. Keith is asking \$14,900. Anyone who wishes to contact Keith can call or write: 826 W. Broadmoor Street, Peoria, IL. 61614 tel: (309) 691-7080.

NEW IDEAS:

George Gennuso has passed along several interesting comments. First, he has informed me that a Mazda 626 lower air conditioner vent fits perfectly in the Pulsar air vent door openings. George is quick to point out that the vents have not been flight-tested and there is some question as to whether they will remain closed at flight speeds. He does tell me that the center hinge mechanism should utilize ram air to keep the vent closed, but no test results to date.

His next point dealt with the Pulsar wheel fairings. George has substituted the factory wheel fairings for the Harbor Ultralight Model 134 fairings. He said that the Harbor fairings are a bit more streamlined and anyone interested in them can contact Harbor at 1326 Batey Place, Harbor city, CA. 90710 tel. (213) 326-5609.

Lastly, George has also put together an extensive write-up which details a procedure of building the Pulsar fuel tank without having to remove the instrument bulkhead. He has written an 8 page supplement detailing how to do this. Since it is too lengthy to reprint here, I ask that anyone interested in obtaining a copy send a request to George at 2917 Denmead Street, Lakewood, CA. 90712.

Tom Hines has provided me with some information on his antenna installation experience using RST and Northstar antennas. I'm waiting on some information from RST to supplement Tom's and will print it all in Issue #2. If anyone else has started an avionics installation (or already finished up---fess up Lavern) I would like any information you can offer. The inherent problems associated with non-metallic aircraft make avionics installation very important.

INFORMATION REQUESTED:

Mark Brown has asked me to solicit information from everyone regarding tachometers which don't utilize one of the Rotax electrical coils. A couple of Pulsar builders at the Oshkosh builder's forum talked about such a tachometer and more information is needed. Using a tach which doesn't require a coil will free up a couple more amps for avionics use. Please let Mark or myself know if you know about a tach like this.

Also, I have very recently received some information from several of you which does not appear in this issue. Due to the lead-time required, I wasn't able to get everything in this issue. Don't despair as it will be in the next issue.

FROM THE FACTORY:

Since the last newsletter, the production, construction, and flying of the Pulsars have gone so smoothly that there's not much news in that area. A couple of builders are into the finishing process and should be flying in several weeks. We fly our Pulsar almost daily and everything is working perfectly. We have over 130 hours logged now and Lavern's airplane probably has 75 or 80 hours by now. Our production is on schedule and we're sold out through June '90, so we are planning a modest expansion of our facilities and a careful increase in production rate.

We have more good news from Rotax. They've been working on a solution to the "bog down" problem that occurs due to propeller overload. I've mentioned this problem before in connection with compromising our cruise speed because the engine bogs down to a dangerously low power level if I try to use a prop with a cruise pitch. Well, they've reported big improvements in midrange torque by increasing the engine displacement to 582cc. The top end horsepower remains the same, but the torque curve is much improved. Therefore, we have high hopes of getting back some cruise speed by using a more reasonable prop pitch.

This new Rotax 582 will have the dual CDI ignition, larger crankshaft, and improved castings just like the 532 that we're flying now, but it will also have bigger cylinders. Rotax has decided to incorporate all these changes at the same time, but since the larger cylinder testing has just been completed, the production schedule for the 582 has set first deliveries for late December.

This new schedule will cause a delay for a few of you and I am sorry for that, but I'm also very pleased with the work Rotax has done, and feel the new engine is well worth the wait. Of course, if anyone chooses not to wait, we can get the standard 532 for you in just a matter of a couple of weeks. Then later, you might want to replace the 532 engine with the new 582. Just drop us a line or call to schedule delivery of the engine of your choice. Note also that we can ship the "engine kit" less the new 582 engine to anyone wishing to continue building while waiting for the 582 engine. We'll then ship the 582 engine once we receive them from Rotax.

Now I have a correction and addition to bring up. Bob Townsend followed the standard procedures for glass bearing construction, but the bearing stuck to the torque tube. I think the problem is the epoxy. I wrote the procedure for Safe-T-Poxy, but now we're using Epolite 2315. The Epolite sticks to aluminum so well that I'm going to add a note to Step 3 in the procedure that says: "Don't buff the wax between coats. Let the wax build up to 3 full coats." I'm sure this will solve the problem because we tried it.

We've also discovered that the aft landing gear attach plates (AD134) are too small. They should be 4"x4.5" but until a few weeks ago we were sending out plates that were only 3"x4". If you have the small plates and they're not installed, send them back for exchange. If you've installed the small plates, you don't have a problem. The small plates are totally acceptable for load bearing, however, they just don't fit in place very well and cause a more difficult layup.

If any of you have already received your tachometer, but are waiting for the new engine, please send the tach back to us for exchange because the old tach won't work with the new engine.

One last subject: When we ship out extra material or parts to accommodate a builder modification or mistake, we send along an invoice to cover our cost. I know all of our builders are honest folks and they fully intend to pay their bills, but the invoice ends up in the garage under a pile of Pulsar parts and is forgotten. Well, I understand all that and I certainly don't want to insult anyone, so don't feel like it's a question of trust. I consider all of you partners in these projects and friends. But it would sure save me a lot of time in paperwork if we just sent these items out C.O.D. Then you wouldn't forget to write the check and I'd save a lot of bookkeeping time. UPS does charge \$1.75 for C.O.D. fee so if that's a problem let me know and we'll work out a pre-paid arrangement.

I must also tell you folks that it's a pleasure to work with you. We all share a common interest and I really appreciate your input. No one could ask for a better bunch of builders.

Sincere thanks,

Mark

LATE NOTICE:

I have just received word from Mark on two additional matters of importance:

1. Aileron Long Pushrod:

Due to accumulating dimensional errors associated with the installation of the aileron long pushrod, Mark has asked that everyone check the pushrod penetration into the fuselage prior to constructing the root rib bearing. Apparently, the pushrod can build up an alignment error with a possible result of the aileron coming into contact with the landing gear tabs. Be sure to check all measurements and alignment.

2. Epoxy Allergy:

A general warning about the new Epolite 2315. One of the Pulsar builders has developed an epoxy allergy resulting from the use of Epolite 2315. Mark wants everyone to please be aware of the possibility of skin reactions and to wear rubber gloves and protective clothing when working with 2315 (as should be done when working with all epoxy resins).

Mark has noted that testing of a vinylester resin is underway which will be used as a safe alternative to the 2315, so there should be no concern from anyone.

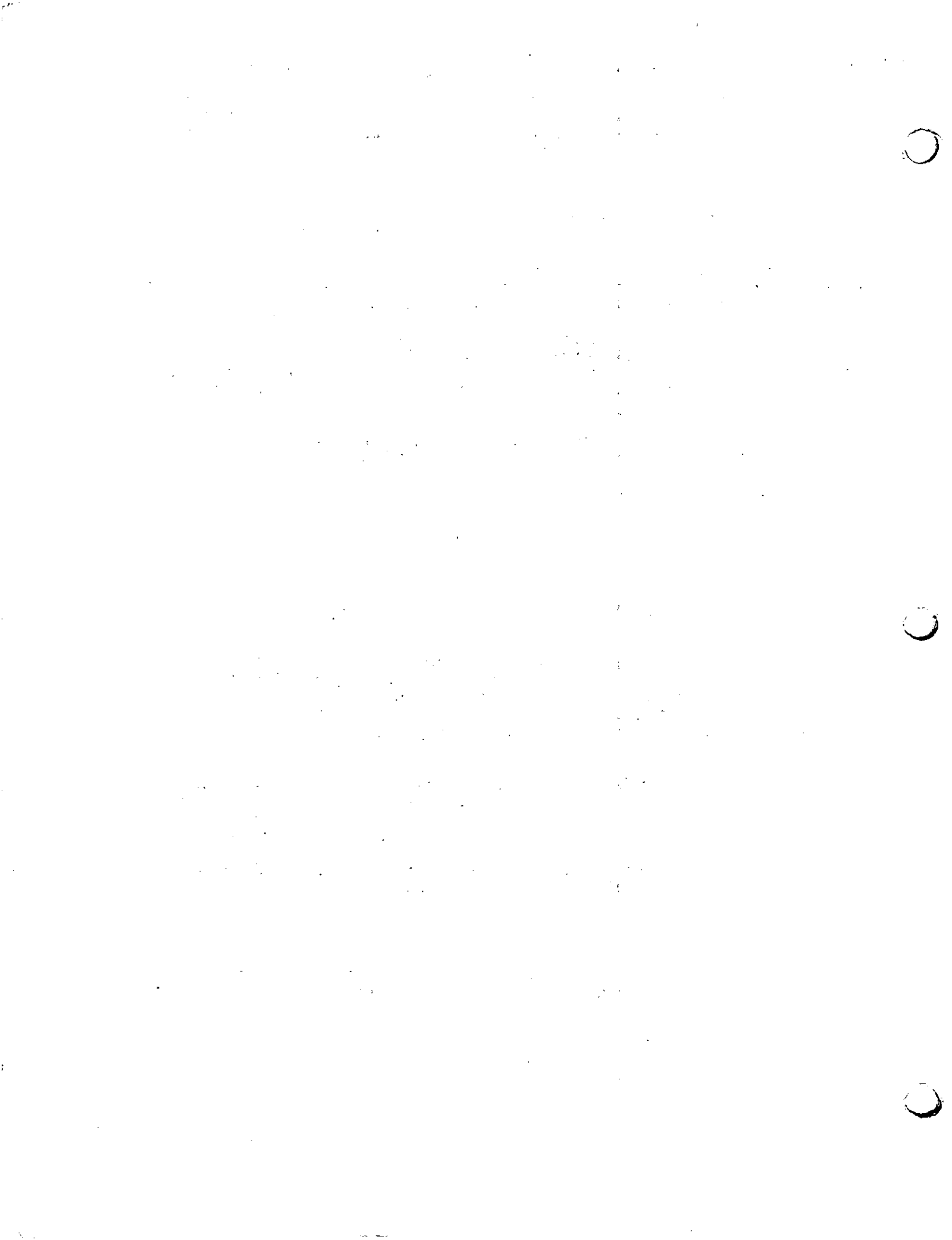
WRAP-UP:

I hope that you have found some of the information in this first issue helpful. Improvements are certain to come with time. Please send all letters, info. (and checks) to my home address:

Mike McCann
408 Evergreen Avenue
Glen Ellyn, Illinois 60137
(312) 858-2418

See you in two months!

Mike.



Pulsar News

News, Updates, and Developments for Pulsar Builders and Owners

Issue No. 2

Published by the Pulsar Builders' Association

January, 1990

OPENING:

A post-holiday hello goes out to all the Pulsar builders from Mark and myself. Congratulations to Laverne Lawrence on the recent Kitplanes article featuring her Pulsar at Oshkosh '89. The article was very complimentary and can be added to the growing number of articles on the Pulsar.

Issue #1 of Pulsar News promised that this issue would have avionics information from RST regarding "plastic" airplane avionics. Unfortunately, RST has been busily working to get their new catalog out and hasn't been able to respond to my request. Tom Hine's avionics information is included and should be of interest to everyone. I hope to have the RST information A.S.A.P.

This issue also features the first of two parts on the Pulsar finishing process. Harry Jones has been very generous with his time in writing a detailed review of his experience. This issue will cover the preparation for painting. In Issue #3, Harry will review his experience with painting his Pulsar. I've received numerous requests from builders looking for more information on the finishing process and I know that Harry's comments will be very helpful.

PBA UPDATE:

The Pulsar Builders' Association is now accepting subscriptions from interested persons who are not necessarily Pulsar builders (currently). I've been contacted by several people who wanted to learn more about the Pulsar from the builders themselves. Mark says "the more the merrier" so please pass the word on to your friends who want to be part of PBA. Ben Owen of EAA was very glad to hear that a builders' association was formed for the Pulsar as they have been getting calls looking for information on the Pulsar.

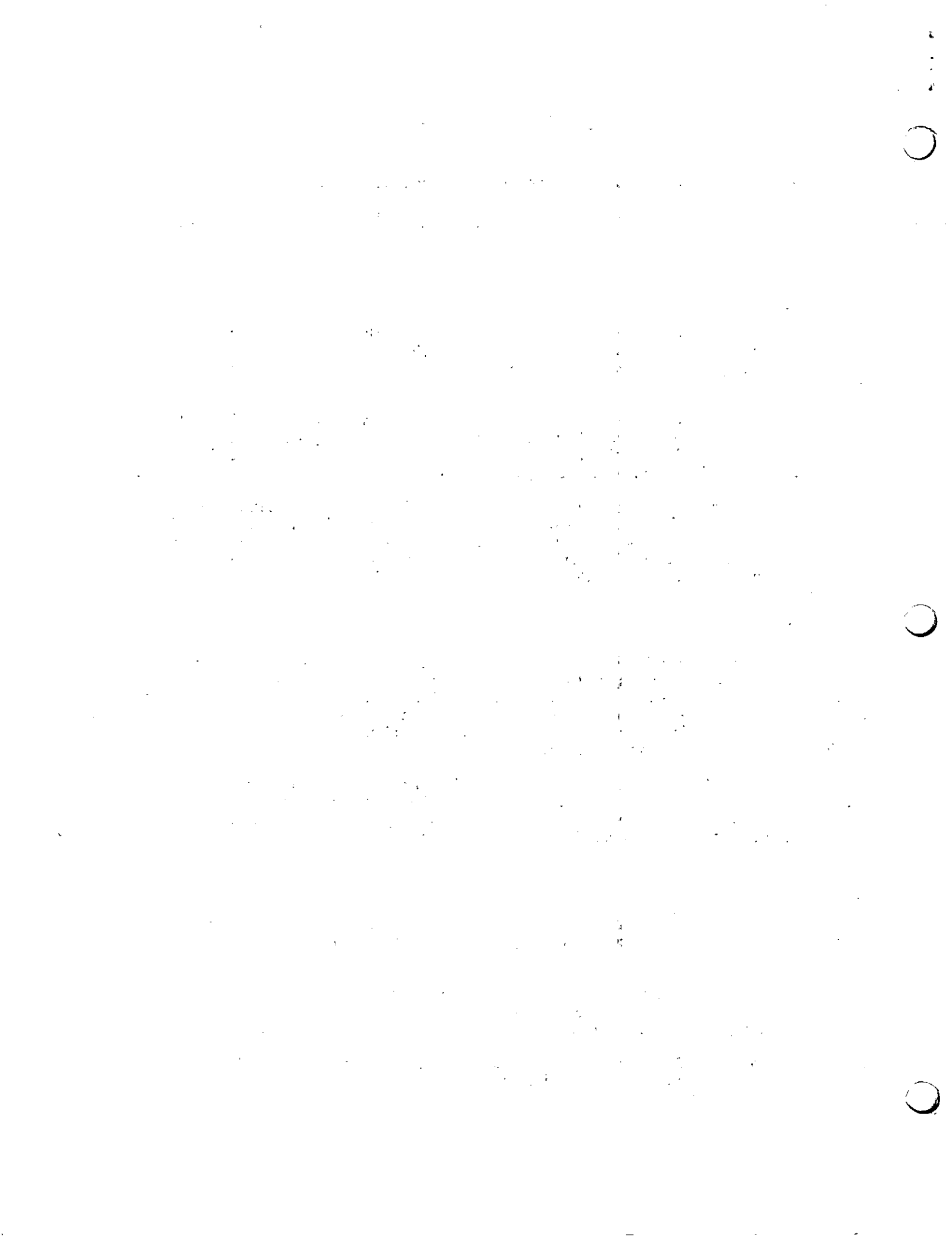
In a related item, PBA is trying to schedule a builders' forum during Oshkosh '90. I've been in touch with the powers that be at EAA and they are trying to schedule it as close to Mark's "Pulsar" forum as possible (for people who won't be able to stay the entire week). EAA hasn't gotten back to me yet, but I will certainly keep everyone posted.

BUILDER INPUT:

I've received a good amount of information from many of you which is greatly appreciated. If you don't see all of it in this issue, don't worry...it will appear in the next issue.

Stan Buchholtz

1. To stiffen the areas under the area where your heels will rest at the rudder pedals, bond some short "composite struts" (you can use foam insulation-ed.) under the forward edges of the floorboard, midway between the rudder pedal center and the outboard bearings.
2. At the forward end of the canopy side tracks, leave a small depression in the fuselage shells. By doing this, the canopy rollers will pop into the depressions as it is pushed forward and will hold the canopy in the open position.



3. The cowl sections should be measured diagonally from the firewall to the forward corners before cutting to the scribed trim lines. If there are any inequities, you may not want to follow the trim lines exactly.
4. Before bonding the cowl in place, cut the slots in the firewall for the unidirectional glass support strips. These cuts are much more difficult to make with the cowl already in place.

Tom Hine

We have utilized the RST antenna systems for our Pulsar. The navigation antennas were placed under the leading edge of the wing before applying the plywood skin. The two dipole ends are slightly angled forward and supported by one inch foam blocks between the ribs. The RG 58U (available at any Radio Shack-ed.) coaxial cable is led straight back to the aft spar and then inboard. We did utilize the Northstar Loran antenna for our loran and located it in the vertical stabilizer. It is a 27 inch piece of RG 62 A/U coaxial cable with 22.5 inches unshielded and 4.5 inches shielded to the end of the BNC connector. The BNC connector connects to the Northstar Antenna Coupling Unit located just under the vertical fin. We tried it out before sealing the fin with a local shop receiver and got signal to noise ratios greater than 85 dB.

Harry Jones

1. Wing Skins: Plan to leave one quarter inch of excess skin hanging inboard of rib #1. You will need this to produce a perfect fit to the wing root. It is easy to trim to form the fit with a sharp hand-plane.
2. Wing Steps: Be sure the foam pieces are completely bonded to the upper wing skin. Use plenty of wet micro. If you don't, a bulge may appear on the upper skin later which is very unsightly.
3. Engine Alignment: Be sure you have the mounting bolts tight and about the same torque when you do the alignment on page 21 of the manual. Variations in bolt tightness make a surprising change in the gap and position of the spinner versus the template.
4. Radio Depths: I built a 1.75 inch deep recess into the back wall of my fuel tank so radios would not protrude from the instrument panel.
5. Wing Balance Arm Weights: To drill in the lead for screws without the drill bit freezing, use generous amounts of engine oil or better yet, use "Never-Seez" which is available at any auto parts store.
6. Sling stands: Be sure to round off the top corners of the up-rights and pad them with cloth. As the fuselage gets heavier, you'll get dents into the fuselage as you rotate it otherwise.

Subscription Reminder:

Just a quick reminder to everyone who hasn't sent in their \$10 for the newsletter. I know that the holidays in November and December cause many things to be put aside. Everyone who has yet to subscribe, please do so now to keep the newsletter going. Thanks.



"The Pulsar Finish--Part 1" by Harry Jones

The Pulsar finishing process appears to be one to be reckoned with. I'm just completing it and I'm worn out, mentally and physically. Although I've done a good bit of fiberglass work before, this is my first experience with pre-preg. For what it's worth, here are my comments:

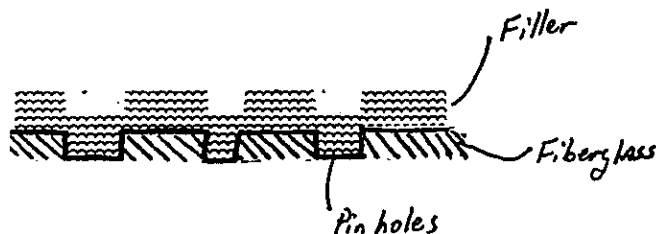
Unless you have some solid experience with this particular type of work, I'd suggest you turn the entire job over to a professional aircraft painting outfit. As there also are a variety of other "vehicle" paint shops (auto, boat, etc.), you might find one of these valuable, if they understand the problem of painting all the way around the wings and fuselage. The process may cost you \$3,000 or more, but you'll be much better off and flying much sooner. Remember, just the filler, primer, and Imron paint will cost you \$400-\$600.

I could not find agreement on what primer materials to use. DuPont 131-S is no longer recommended by DuPont under Imron except for use on steel. I tried the DuPont "Corlar" 824-S. It's OK but it is expensive and takes 3-4 days before you can sand it without terrible paper clogging. It is harder than the polyester primer types and seems to shrink and "photograph" after a week or two. If I were to go through this again, I'd try Morton's Eliminator or Feather Fill. These are two-part polyesters. They are much cheaper, sand very fast, and "kick-out" very fast for sanding. Morton's is ready after drying overnight and I'm told that Feather Fill is even faster. Morton's Eliminator squeegees into pits and pin holes much better than 824-S and you can spray on a thicker coat. I spent nearly 350 hours spraying and sanding 824-S, but maybe I'm slow. Two and one-half gallons of Morton's might do the job and you will sand most of it off.

There are five jobs which the filler and/or primer must do:

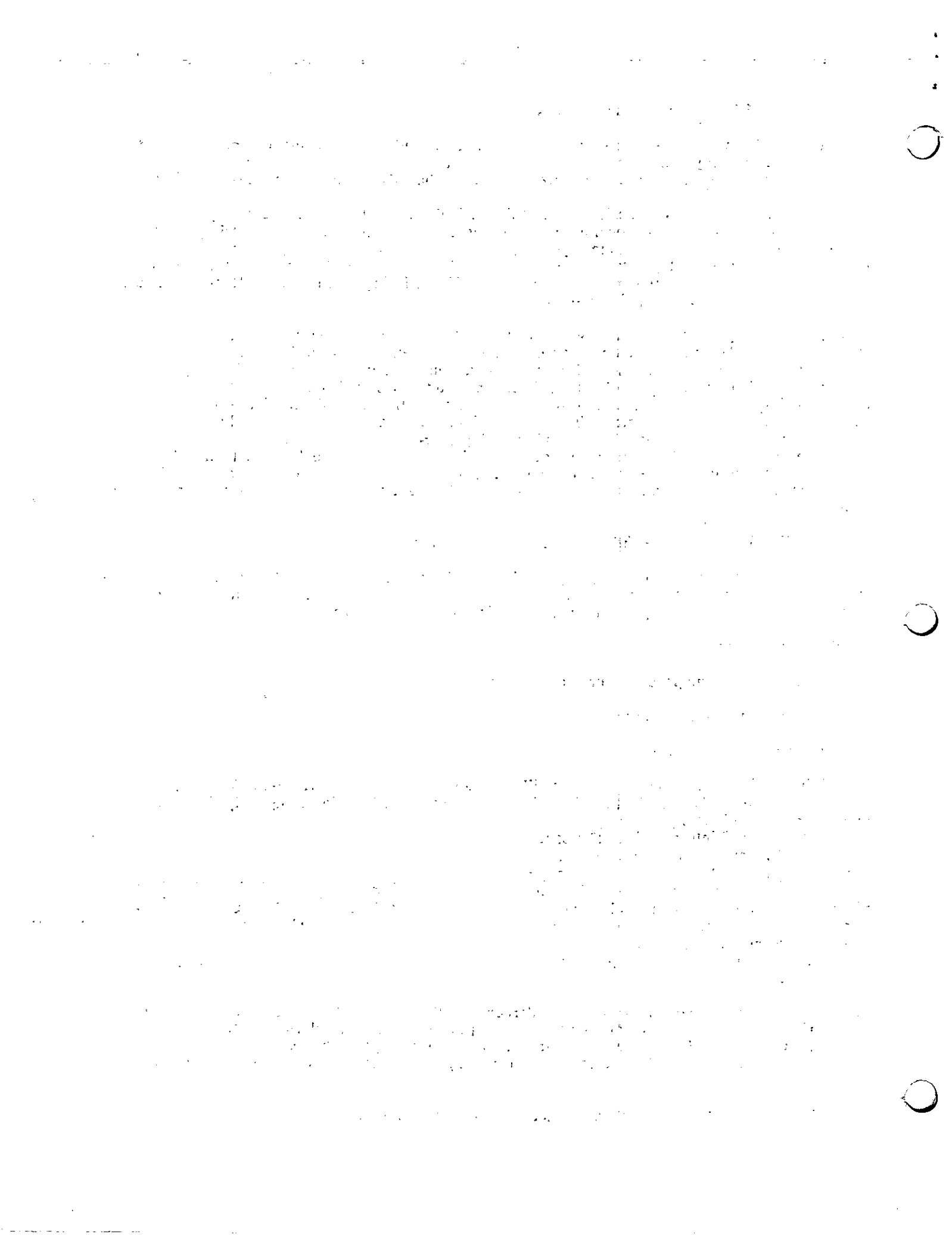
1. Fill the pin holes. (Get out a magnifying glass and look carefully at your fuselage. Suddenly you will see the big weave pits - several hundred per square inch. At the bottom of these pits are often pores or pin holes which go right through the glass to the foam).
2. Fill the weave pits.
3. Provide a smooth, single-color surface for the Imron.
4. Seal out moisture-vapor, and;
5. Form an ultraviolet barrier.

The pin holes, in my experience, must be filled by squeegeeing a low surface-tension material back and forth over them until they clog. The weave pits must be filled completely, initially by squeegeeing and finally by spraying. The spray will not "run" into the pits. The coats of filler will form similar to the diagram shown herein. You have to build up enough filler so that you can sand down to the surface of the pits without sanding through the high spots. The best moisture seal is epoxy (and should be used first on the wings), but Morton's Eliminator is supposed to be adequate on non-wood surfaces.



The U-V layer can be your regular primer darkened with 2% lamp black or can be a dark primer. If any of you know of a source of fine lamp black powder soluble in polyester, please write Mike or Mark. The powder I used was too coarse. I'd also like to suggest that each builder relate their experience and materials used to Mike. That way we will soon have a decent method worked out.

--NEXT MONTH--Harry Jones' experience with painting a Pulsar.



FROM THE FACTORY

We have good news from Rotax. The new 582 Dual CDI engines are on their way. Twelve engines should arrive on our dock next week (December 19). Of course, I get the first one and I'll fly it as quickly as possible to select a new prop (hopefully a faster one).

More good news concerns the electrical power output. The Rotax people have told me over the phone that the 582 will supply 12 amps of power instead of 7 amps like the old 532! The only bad news is that we haven't received any tachometers for the new engines yet. This engine produces a different electrical signal than the old engines and the Westach people haven't matched it yet.

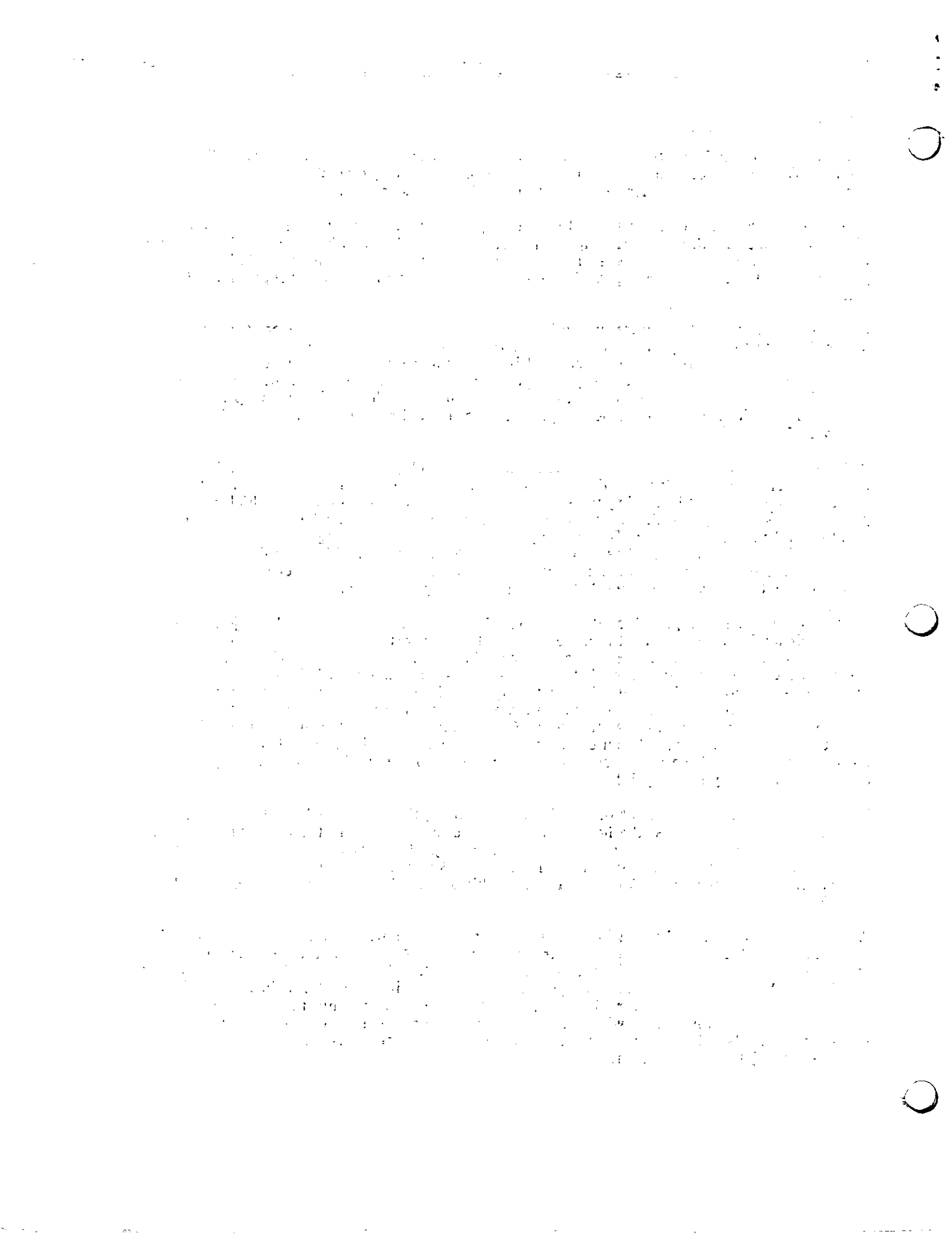
In our recent flight test activities, we've been conducting a temperature and pressure survey under the cowl to identify the best heat source for a cabin heater. Unfortunately, the radiators are not it. The pressure differential is good, but the air temp rise through the radiators is only 30 degrees; not nearly enough for a heater. Therefore, the muffler is the only possible heat source. We are working on a thin shroud with heat fins to wrap halfway around the muffler, but with the new engine coming in we'll have to delay this work until the new prop is selected.

We've received some questions about surface finishing. We've talked to a few other kit manufacturer's and they all think they have the best process, but from our experience they're all about the same. It's just going to take several weeks of sanding no matter which way you go. The worst part is that the surface finishing stage comes at a time when you're tired of building and very eager to start flying. Anyway, we think the finishing process in our engine and finishing manual is as good as you'll find. Just don't allow the filler to build up and add weight or you'll be disappointed. Also, make sure and use a catalyzed primer so it doesn't shrink under the top coat and reveal the faint texture of glass weave.

On the subject of sanding, we've talked to a few builders who've had to sand the joining flange of the primary fuselage joint a little more than we feel comfortable with. It seems that our manufacturing process sometimes leaves a very slight "lip" along the corner of the joining flange. Of course, you have to sand the "lip" away to get a smooth flush joint. However, the glass that wraps around this corner is structurally essential to carry the fuselage outer skin loads into the joining flange. If you have such a lip on your composite parts, use a thin layer of auto body filler to smooth over the joint. Or you can sand away the lip and use strips of glass to reinforce the joint. If you choose the glass, use 1 inch wide strips of 3 oz. glass (two layers). This will be very easy to fill and smooth into the fuselage contour for painting and gives you a very strong joint.

We've received a few calls about the difficulty of opening the crates. All we can say is that it is our only defense against the horrible handling that occurs with all the freight companies. We've had two fuselage kits totally destroyed in shipping. That costs delay for the builder, but also costs us time and money in several ways. It takes us four months and a pile of paperwork to recover a claim for just part of the kit price. When you open your crate, take the top off first.

A few builders have asked about inspection holes in the lower wing skin. We inspect the aileron bellcrank through a cutout in the rear spar, but an inspection hole is not a bad idea. I'd recommend a 5 1/2" x 4" cutout in the skin under the bellcrank. Then bond a 1" wide doubler "ring" made from wing skin. Size the doubler "ring" so that it is 4 1/2" x 3" inside and 6 1/2" x 5" outside. This will allow the doubler a 1/2" wide lap bond onto the wing skin and 1/2" overhang into the cutout. This will form a recessed lip to screw a flush door to. Use six nutplates inside the wing on the back side of the doubler and six pan-head screws (like the cowling screws) through the door.



One builder has tried using Alumiprep 33 in lieu of washing/sanding all the aluminum parts in preparation for bonding. I don't believe the Alumiprep will provide any cleaner surface than washing/sanding and certainly not as much mechanical "bite". However, we've not tried the Alumiprep so we can't disapprove it. Just make sure and do a couple of peel tests to compare the relative strength of the bonds. A double layer of 2" glass tape laid on a test piece of aluminum will tell you which is best.

We've looked at a couple of types of hydraulic brakes (even though I don't think they're necessary). The brakes from Great Plains Aircraft in Palatine, IL. would be my pick if I were going to try some. They can be used on the Azusa wheels in your kit. However, you will have to modify your axles to fit. I've got about 500 landings on our band brakes and they still work fine.

WRAP-UP

Thanks to all of you who sent in helpful suggestions, ideas, etc. I ask that you keep sending them in and we'll keep passing them along. I'm especially looking for builder suggestions to simplify/improve on the building process. Please send everything to the following address:

Pulsar Builders' Association
408 Evergreen Avenue
Glen Ellyn, IL. 60137

Also, please feel free to call me if necessary:
(708) 858-2418

Thanks again and see you in two months.

Mike

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. This ensures transparency and allows for easy verification of the data.

In the second section, the author outlines the various methods used to collect and analyze the data. This includes both manual and automated processes. The goal is to ensure that the information is both reliable and up-to-date.

The third part of the report details the results of the analysis. It shows a clear upward trend in the data over the period covered. This indicates that the current strategies are effective and that there is significant potential for further growth.

Finally, the document concludes with a series of recommendations for future actions. These include investing in new technologies, expanding into new markets, and continuing to refine the data collection processes.

