Pulsar News

News, Updates, and Developments for Pulsar Builders and Owners

Issue No. 20 | Published by the Pulsar Builders' Association | January, 1993

NEW NEWS:

Happy New Year to everyone. A couple of changes are worth noting up front in case you miss them later in the newsletter:

• Changes in the Aero Designs telephone numbers are effective 1/11/93. See **From The Factory** for details.

• In an effort to devote more space for specific topics of interest, future issues of *Pulsar News* will be expanded and the mailings will be quarterly instead of bimonthly. As has been the case in past issues, if one topic is featured (instrument panels, lighting systems, etc.) there is little room left to discuss any other important information. We hope you find the changes positive and we welcome all comments and suggestions.

• As promised in Issue #19, we have included an index of all *Pulsar News* articles contained in issues #1-20. The index is by subject matter and should assist builders in locating information on specific topics.

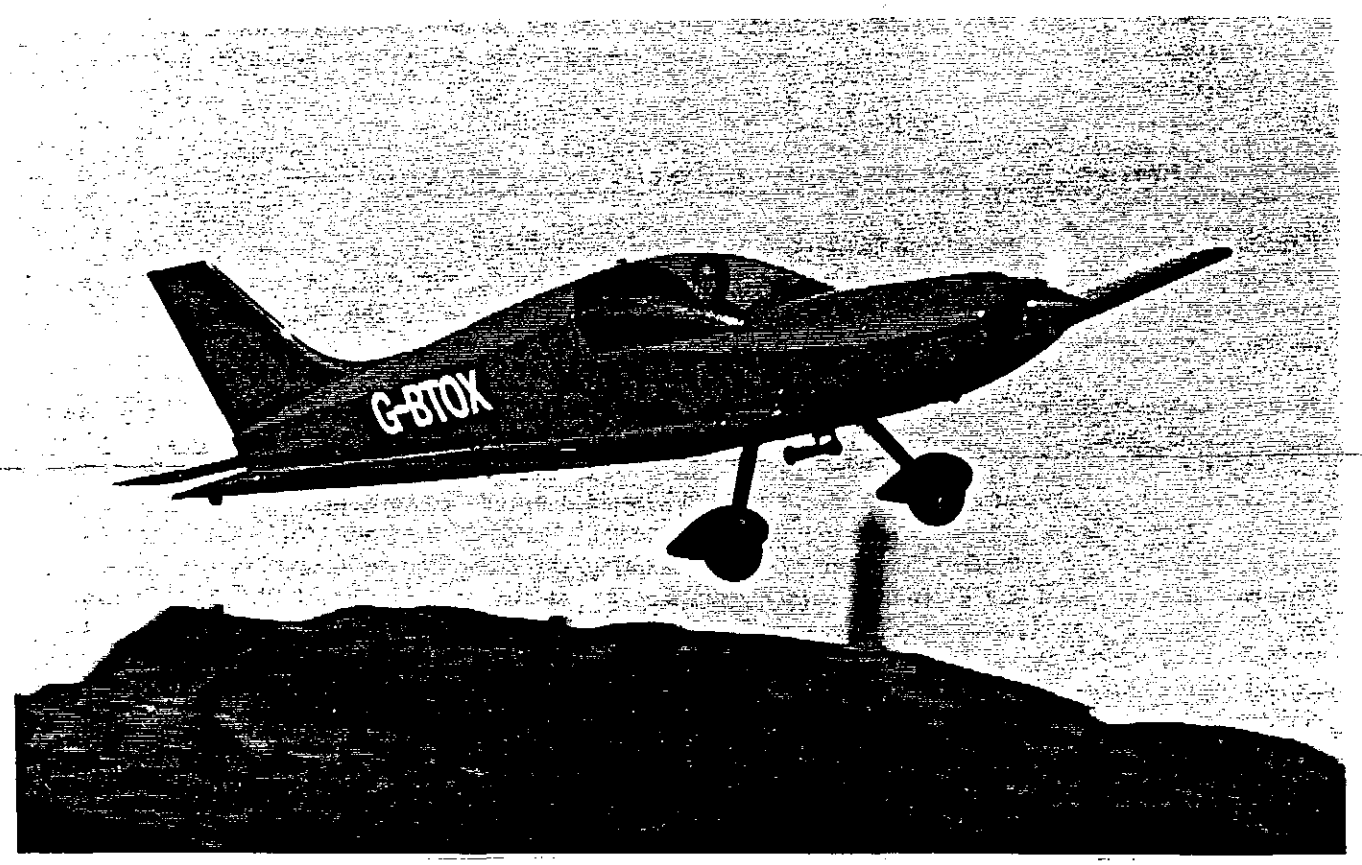
PILOT REPORT--KEN MCWHINNEY (NORTHERN IRELAND)

I thought I would drop you a line to let you know that my Pulsar is built and flying. My Pulsar is a little unusual as I have built it as a taildragger with the Rotax 582, but I have used the wing tanks from the 912 version. I have done a couple of other mods to the Pulsar which I shall describe for anyone who may be interested.

Wing Construction--In constructing the wing tanks, I found it a little difficult to hold the sides of the tanks open to install the tank over the micro on top of the wing spars. I was concerned that I might scrape off some of the micro if I tried to install the tank as described in the manual, so I made some spreader sticks to hold the sides open. I tied a piece of string to each spreader stick in turn and when I fitted the D section of the tank over the main spar, I simply pulled the string and removed the spreader sticks allowing the D section to clamp on the spar. I was then able to press the D section evenly onto the spar until I was satisfied that I had an even bed of micro of the correct depth remaining. I found it a little difficult to spread a fillet of micro evenly inside the tank, along the joint between the tank and the main spar, until my wife Shirley made a spatula from a lollipop stick tied to a piece of 1 inch conduit. The job now progressed and she made it look so easy she got the rest of the job to do. When she was satisfied that she had enough micro in place, she turned the conduit over and made a lovely fillet with the round end. As if this wasn't enough, she then wet out a length of 2 inch tape and laid it along the length of the conduit. She then inserted the conduit with the tape on top inside the tank and turned the conduit over. As I held on to one end of the tape, she drew out the conduit leaving a beautifully formed fillet.

Matching wing to fuselage--One little mod which I did was to construct a fillet between the fuselage and the wing which is cosmetically pleasing. This was done by masking the wings at the roots with waxed insulating tape to prevent my fiberglass fillet from sticking to the wing surfaces. I fitted my wings to the fuselage and bonded a 1 inch fiberglass tape onto the fillet with 0.5 inches overlapping the wing surface all the way around the fillet to create a box section which the wing fits into. After the tape cured, I blended it to the fuselage fillet with car body fillers and after painting, it is now impossible to distinguish from the rest of the fuselage. This mod looks so much nicer than a slot covered with a masking tape. I did a similar mod to the stabilizers but in this case my reason was to give added support to the structure as I did entirely trust the 1/4 inch locating pins. This mod is probably not necessary, but it gave me extra confidence and is cosmetically attractive. (Factory Note: The thin sharp fiberglass edge resulting from this mod could complicate wing assembly to the fuselage).

Filling/Sanding--The only problem I had with the wing construction was the oil canning effect I had on the surfaces between the ribs. I humidified my plywood as described in the manual, but it just did not work. I still had humps and hollows. I filled the hollows (over the ribs) with body fillers and tried to sand them flat with a 20" x 3" sanding board, but I had some difficulty. I discovered that I was using too much pressure on the sanding board with the result that the plywood between the ribs was sinking and I was oversanding over the ribs. This actually made things worse. I discovered the way that worked was to sand only with the weight of the sanding board held between my fingers and at an angle to the wing. I sanded in circles (left to right with the board at one angle and right to left with the board at the opposite angle) until I was satisfied that I had done as much leveling as was practical. As it turns out, in my part of the world, it is impossible to eliminate the effect of oil canning due to the constant changes in humidity but at least it looks uniform and pleasant.



Now that the Pulsar was basically complete the job of preparing and painting was next, so I began to fill the weave of the fuselage. I soon discovered this was no job to be taken lightly, I had filled around 75% of the fuselage and all of the wings when a friend suggested that I might be better to turn the project over to a professional paint shop. I was unwilling to do this as I knew of no paint shop which had experience painting airplanes. Fortunately, I was referred by a friend to an excellent amateur painter who had gained valuable experience painting several Kitfox's. I also had an on-going dream of painting my Pulsar Ferrari Red and I approached Mark Brown for his approval. He reluctantly agreed based on the temperatures we get in Ireland, but was adamant that the Pulsar must be protected from strong sunlight. I decided to use coatings made by AZKO Coatings as they claim their paints contain UV barriers, but only time will tell whether this was a sound decision.

I am extremely pleased with the finished results although a large percentage of the credit must go to the painter, Mr. Richard West. He was extremely careful with the preparation of the surfaces, filling and re-sanding over and over again before painting. In fact, I must confess I thought he was too careful until I saw the finished Pulsar. I then realized just how important this preparation had been. He showed me some parts which he had to repair which I thought were perfect. It can not be over emphasized how important it is to fill the weave if the job is to look right. We discovered the oil canning on the wings was less important than filling the weave to achieve pleasant result.

After the painting was complete, I hooked up the instruments, fitted the brakes, the wheel pants, and finished the hundreds of little jobs which remained. Lots of these little jobs should have been done before the paint job, but unfortunately were not, and subsequently I paid the price in hanger rash. Poor Richard was demented repairing all the little scratches and scrapes.

Mating canopy to fuselage--I should also mention that I spread a bed of micro over the fuselage, covered it with plastic and bedded the canopy down onto it during the building process. I blended this into the lines of the fuselage and it looks as if it was meant to be there. I believe other builders have put the bed of micro under the canopy frame, but I put mine on the fuselage because it gives the canopy more clearance between it and the fuselage. Either way, it is possible to achieve a very tight fit and the soft felt seals it completely.

First Flight--Eventually, the day arrived when it was finished and ready for its maiden flight. I had engaged the services of two competent test pilots for this great occasion, and the subsequent test program. I now had to wait until a suitable time and weather would permit. Like every anxious builder, I thought the event was never going to take place as either the weather was wrong or the pilots were not available. This was sheer torment and I decided to do some taxi work to familiarize myself with the ground handling as I had no taildragger experience at all. I intended to take a conversion course with a reputable school, and my test pilots had agreed to fly with me until I was confident. You will probably guess what happened next as I relate my silly story.

I thank God I did not crash but the luck of the Irish was certainly with me as I committed every sin in the pilots book. I taxied around the airport on several occasions and began to feel comfortable, until one day as I was going down 22 a slight crosswind blew me to one side of the runway. At Newtownards, we have a 34/16 asphalt/grass runway and as the wind was on 16/grass I decided to try taxiing into the wind. I had only used very small throttle settings on the hard runways and was surprised at the difference the grass made. I thought I would use the grass to my advantage and I imagined that this would be ideal to get the tail up slightly (to expand my taxi practice). I went to the end of 16 and lined up into the wind. I applied gentle power and was surprised that I had to increase the throttle dramatically to get the aircraft moving. I began to taxi fairly slowly (as I thought) and suddenly I realized the Pulsar was airborne. I kicked in right rudder as I had been accustomed to doing in my Mooney, and suddenly I was in a vicious swing to the right. I kicked left rudder and simultaneously stupidly used full left aileron. The Pulsar immediately dropped the left wing and I now used right aileron to pick it up. The reaction happened so quickly that I almost buried my right wing in the grass. Truthfully, I was all over the place totally confused and unprepared. By this time I was no longer over the runway and a sea wall was looming up at the side of the airport. I had no option but to use full power and do a go-around. The control forces were so much lighter than my Mooney I was taken completely unaware and I was using too much input causing all kinds of cock-ups, giving one of the most spectacular and dangerous take-off's imaginable. At this point thankfully, I remembered my instructors advice---center the controls, settle down, and gently test the reactions of the aircraft.

My first impression after my initial excitement was that this aircraft was flying beautifully, totally stable, and delightfully sensitive on the controls. I did two circuits and decided that I would try an approach. On the first attempt I was shocked that I seemed unable to slow the Pulsar below 80 mph indicated. However, this did not disturb me as I was unwilling to trust the ASI. After a couple of attempts, it soon became obvious that this would not work since my speed continued to be excessive on approach. I decided to climb higher and to try some slow flying to find the stall. I could not believe the attitude approaching the stall and decided that although I had not stalled at 45 mph, I could try an approach safely at 60 mph. I extended my downwind leg and gave myself a long approach on which I had decided I would be able to sort out the aircraft. I was to be thankful that I had done this as I was to find out that this little bird wants to fly, and accurate slow speed control was initially difficult to achieve. Initially I tried to drop my flaps at 80 mph, but the pressure was so great I was afraid that I might do some damage, so I slowed the aircraft by holding the nose up until I got 65 mph and then I was able to use the flaps. I aimed to round out at the numbers and although the landing was a little bumpy I had no difficulty at all. I

was thankful that I was landing on long grass as this slowed the Pulsar quickly and the drama was over!

I can assure you that I will be taking some serious instruction before I go any further. I only relate this incident to warn others, not as an achievement! Since this event, the Pulsar has been successfully test flown by a test pilot who is delighted with the airplane. He reports that the Pulsar matches most of the performance figures published by Aero Designs but warns that the stall performance is sensitive to loading. He found the solo stall occurred at 40 mph clean and 42 mph with flaps. When loaded to 960 lbs., the Pulsar stalled at 48 mph clean and 45 mph with flaps.

The stall buffet occurred at 50 mph at gross weight (no flaps) and in all circumstances the Pulsar would drop the nose approximately 15 degrees at the stall. The airplane also drops a wing around 10-15 degrees at the stall, but it seems this can be either wing relative to how the aircraft is loaded.

My test pilot also reports that accurate speed control is vitally important to achieve decent landings. He confirms that 65 mph is a reasonable approach speed but warns that 5 mph above *this will* change the approach angle and the rate of descent dramatically. Flaps are necessary to achieve a reasonable sink rate, and when flown solo, the approach speed can be reduced to 55-60 mph for better results. He found the Pulsar to float in ground effect which makes the landing a little more prolonged but by holding off properly, this did not present a problem. With accurate speed control in the round out, the landing distance can be reduced. The only criticism he had was about the landing characteristics, which he thought might surprise some pilots, but with proper instruction would present no problem.

You will see by the photograph I have installed a venturi to drive an artificial horizon and a turn and bank indicator. Unfortunately, the venturi is not working properly and I believe this is due to turbulent air from the propeller. I am going to shift it to another position to see if it will work better.

Some details of my Pulsar are as follows:

Empty weight: 485 lbs.
Left wheel: 237 lbs., right wheel 233 lbs., tailwheel 15 lbs.
Empty airframe moment arm: 33.43 inches.
Stall (solo/clean): 42 mph
Stall (dual/clean): 48 mph
Approach speed (solo): 55/60 mph
Approach speed (dual): 65 mph
Cruise performance (960 lbs., 2,000', 1029 mb, 12°C)
5000 RPM: 95 MPH 5800 RPM: 125 MPH 6200 RPM: 130 MPH

The aircraft will exceed 135 MPH if power is held to 6800 RPM. These speeds are all indicated and red line RPM of 6800 can easily be exceeded.

One improvement I would most definitely do if I were to build another Pulsar would be to lower the seat bottom as headroom is limited. I believe Aero Designs has suggested that this can be done by moving the flap level mechanism forward 2 inches allowing the seat bottom to be installed at a steeper angle which will allow the pilot and passenger to sit deeper into the seats (call Aero Designs for details if you are interested). I believe the forward and center seat bottom supports could also be lowered slightly and with a narrower center consul much greater comfort would result.

NEW CANADIAN DISTRIBUTOR:

Bruce Millar recently wrote me to announce that his company, Aircraftsman, will be a Canadian distributor for the Pulsar airplane. Bruce writes "At Oshkosh '92 it was determined that the Pulsar fits into our Canadian certification for what we call Advanced Ultralight. What this means is that schools in Canada can use the Pulsar for such things as basic training, rentals, etc. Under these rules we can provide our customers with completed ready to fly Pulsars that we will assemble from kits. I thought that you might want to mention this to your readers just in case some of them would like some professional help in assembling their Pulsars. We will do partial as well as complete assembly. The licencing of the Pulsars would be in the experimental category in the U.S."

You can reach Bruce at:

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BUILDER INPUT:

Gary Polizzotto (Atlanta, GA): I have just finished speaking to the people out at California Power Systems about the constant cracking I've been experiencing in the inlet elbow to the muffler. They told me that we are mounting them incorrectly by welding the downstream end of the 90° elbow (the one that is spring-mounted to the exhaust manifold) to the rest of the exhaust system. They said that this MUST be spring-mounted also. To clarify, this is the small 90° segment that passes under the motor mount with a pivoting socket arrangement at each end. The only ways that I noticed the cracks in mine is because I used white heat treating paint to keep the heat in the exhaust system. This allowed the black hairline cracks to show up immediately. If I had left the system black, I never would have noticed the problem because it occurs on the bottom side. It might be a wise idea for the other builders to periodically slip a mirror down there to check and avert a possible fire situation.

FROM THE FACTORY

We have some really exciting news for this issue. We've been delivering Pulsar kits for almost four and a half years and we've very proud of our production capability, kit quality and builder support. However, we've always realized the need for better business operation and marketing. Well, now we have it. We're very proud and excited to announce that Bob Kromer will join our factory team as our General Manager starting January 11th. Bob brings over 17 years of aviation experience to the Aero Designs team. His first ten years were spent as Flight Test Engineer and Engineering Test Pilot for Cessna, Fairchild, and Mooney Aircraft. Then in 1986, his talent for

management and communication became so obvious that he was promoted to Executive Vice President and General Manager of Mooney Aircraft. When Mooney was sold in 1990, Bob moved to Swearingen Aircraft as the Director of Marketing. Of course we feel extremely privileged and flattered that Bob is bringing such outstanding credentials to Aero Designs.

Relating to Bob's move to Aero Designs, we are installing a new phone system that will be effective on January 11th. From that date forward, the builder support number will be 210-308-5915. Our 308-9332 number that is published in all of our advertisements will be answered by Bob as our sales number.

Now, on the subject of propeller development: You wouldn't think that after almost five years of flying Pulsars we would still be changing our production propeller. At least that's what we wish. However, since the propeller is the single most important influence on performance, we just can't let go of it. Actually, the case at hand doesn't affect performance so much as it simplifies procedures. As we've mentioned before, our regular production prop for the 582 engine is too much load for a tight new engine which means that we must send out break-in props for the first 40 hours or so of a new Pulsar. We've tried for years to find a ground adjustable prop that would provide equal performance to our fixed pitch prop and provide the adjustment needed for break-in. Well, we finally have it. GSC of Canada has designed blades specifically for the Pulsar that match the performance of a fixed pitch propeller. Therefore, starting in December 1992, we will be sending the GSC ground adjustable props with all the Pulsar kits. Instructions will be included which specify one pitch setting for the first 40 hours of operation and a higher pitch setting as the engine will allow. Pulsar owners needing replacement propellers are encouraged to use the GSC prop even though it will require a spinner rework. The fixed pitch props will not be held in stock so they will be special order only.

We've recently learned of a few Pulsars that have landing light installations that have not been approved in writing by the factory. Let me explain how dangerous this is in the case of a light installed in the leading edge of the wing. All wing torsional loads are resisted by the wing skin. If any cut is made in that skin, the torsional load must redistribute around the cut which causes a concentrated load in the structure adjacent to the cut. Since the wing was not designed to accommodate such stress concentrations the wing could fail as a result. The common approach to support high local stress levels is to install a structural doubler around any cutout. That can be done if static strength is the only consideration. However, if structural stiffness must be considered, a local doubler is not much help. Of course the primary influence of stiffness is on flutter. The Pulsar was designed to be safe from flutter by mass balancing the critical control surfaces and designing for stiffness. Anything that compromises the stiffness of the structure, especially like a cutout in the wing skin, produces a serious risk of flutter which is usually catastrophic.

The only way to install a landing light in a wing and maintain the stiffness equal to that of an uncut wing is to install the plexiglass lens in such a way that it will carry the torsional loads the same as the original wing skin. Of course the details of this type of installation are important so we want to communicate directly with any Pulsar owner who is considering or has installed a landing light.

Related to the structural nature of the landing light installation is the operating temperature of the system. Any temperature above 140° F will significantly reduce the strength of the surrounding structure. We have no way to predict how much heat a landing light will produce so we must leave the design of the heat shields and insulation to the owner.

In the September, 1992 *Pulsar News* we approved a landing light kit supplied by Larry Eubanks. However, due to the potential variations of his kit that could prove disastrous we hereby reverse

and withdraw such approval. Any and all landing light installations must be approved in writing by the factory.

We have just received a call from Bill Baltes that he had a forced landing in his Pulsar. First, we sincerely thank God that he wasn't hurt. Bill was enroute from one airport to another when the engine started sounding a little different. He immediately noticed that the water temp gage was so hot that it was off the scale. He tried to gain some altitude but the engine quite at about 2500 feet. Bill almost made it to his destination airport but had to put the Pulsar down about 200 feet from the end of the runway. The ground was so soft that the landing gear sunk in and broke away from the airplane. The sudden deceleration dug the nose in and cracked the cowling. Upon inspection, Bill found that he had only about a quart of coolant left in the cooling system. He's presently studying his cooling system to try and determine how the coolant leaked out. We will report his results if he can find the problem. At this point he suspects that his vent hose form the front of the engine may have been loose. All we can say at this point is to carefully inspect all hoses and clamps on your coolant system regularly.

We recently received a set of rudder cables that were wisely sent to us for inspection by a Pulsar builder because he decided to solder the end fittings on to the cables in lieu of swagging. The heat used in the soldering process severely weakened the cables so we'll send him some new cables. Please follow this builder's example and let us help you evaluate any deviation from the standard kit process or material. Safety is our most important business.

MISCELLANEOUS

My thanks to Ken McWhinney for his detailed report on several building areas and the account of his test flight and subsequent flying performance. This type of information is appreciated by all of us who have yet to arrive at the "first flight" stage.

All correspondence should be sent to:

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Pulsar News

News, Updates, and Developments for Pulsar Builders and Owners

Issue No. 21 | Published by the Pulsar Builders' Association | April, 1993

NEW NEWS:

Are you wondering what happened with the March, 1993 issue of *Pulsar News*? Just a reminder that we have gone to quarterly issues in an effort to expand each issue to cover specific topics more thoroughly.

BUILDER INPUT

Don Surratt (Arlington, TX): Several builders have mentioned a problem with radio interference related to the 582 engine. You might ask in the next newsletter what all the folks have done to fix this. I plan on installing suppression spark plug caps and braided shielding over the spark plug wires as well as grounding all avionics to a single ground source when even I get to the engine and avionics installation. Other than that, I don't know what else can be done with the engine. Also, you might reemphasize to the builders that are flying to keep sending in updates. I am also insterested in more information on vacuum sources. I know there has been some discussion on vacuum sources in past issues, but I still can't live with handing a venturi outside the aircraft.

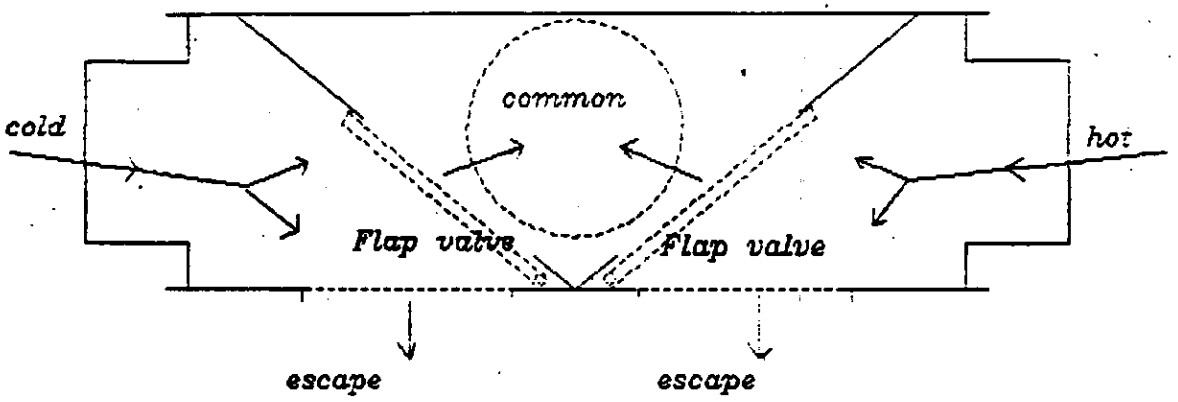
I am currently skinning the upper surface of the wings. One thing I did that I believe was helpful in minimizing humps and bomps in the wing was to fair the aft ribs to each other. When bonding aft ribs I installed ribs #1 and #17 first. Then I ran a string from #1 to #17 along the upper trailing edge to use as a guide for positioning the remaining ribs, this minimizes rib mismatch. When dried, I used a 4 foot aluminum capenters level that I put 80 grit sandpaper on to use as a sweep tool. This allowed me to fair in several ribs at once so I had no high or low spots. I did this prior to skinning and hope it pays off with minimal filler required to smooth the wing surface out.

(Ed. Note: I have received one catalog information sheet on a lightweight 12 volt vacuum source. However, it turns out that the source is NOT for continuous use. If anyone locates a small 12 volt vacuum generator please let us know).

Ken McWhinney (Ireland):

1. Builder Report

Cabin Heater -- Ken has designed a more comprehensive heating system for his Pulsar. Warm air is collected in a box which fully covers the aft surface of the starboard radiator. The box is also fitted with a flide valve to enable summer or winter temperatures to be accomodated. Cold air is collected from a funnel mounted in the airstram beside the radiator. Warm air from the aft radiator box is routed to a heat muff covering the outside of the muffler for further heating. The separate hot air and cold air inputs are connected to either side of a double flap control valve which directs the airflows either to the engine bay or to a common outlet to the cockpit.



The air that is routed inside the cabin is divided with half the air being output beneath the fuel tank and half output above the instrument panel. Depending on your need for heated air, this more complex design may offer builders ideas to generate and route more air. Ken notes that Aircraft Spruce sells flap valves which might be used in the Pulsar.

Brake Pedal Extensions -- I have made a modification to the heel brakes in an effort to improve their operation. I took the brake pedals out and drilled a 1/2" hole in each pedal centered 1/2" below the top end. I then drilled a 3/16" hole through the side of each pedal on the same center line. I obtained two 3" pieces of 4130 aircraft tubing with 0.035" wall thickness and drilled a series of 3/16" holes at 1/2" centers through these tubes using the 3/16" holes in the pedals for a jig. I installed a 3/16" clevis pin through each pedal and 3" tube. This gives me a range of positions for adjustments. I secured each clevis pin with a washer and split-pin. This has proved very successful.

2. Flight Report -- When my Pulsar was tested for flutter at Vne, my test pilot terminated the first test at 130MPH. He reported that there was vibrations present where were hard to define. First we did a complete exampination of every possible part, or joint in the aircraft to determine if there was any structural failure. No failures were visible so we decided that a further, cautious flight should be attempted where the speeds would be increased gradually, taking every sensible precaution.

This flight was conducted close to the airport over several legs of a set couse, each leg to be flown slightly faster than the last. During this flight no undesireable vibratons or problems developed even though the final leg was fliwn faster than the flutter test.

I decided to approach Mark Brown for advise and duely explained the whole scenario. Mark instantly recognized the problem. He explained that we had conducted the test wrongly and in fact what we did could be dangerous.

What we had done was to close the throttle and five to obtain Vne when we should have performed a dhallow dive under power. mark explained that it is necessary to use power as the Rotax 582 engine is 2 stroke and serious damage could result as the prop will windmill while the engine is starved of lubrication. It would follow from this that long descents or approaches without power should be avoided also. This fact is stated in the Rotax Owners Manual, but I feel that we did not fully understand the total implications.

What my test pilot had felt was a 2 stroke engine stutter, and we have discovered that this can be induced by sudden, partial, or full close of the throttle. No further problems occured with the Vne test.

My next point is related to the suspension. I have built a taildragger and I have found the elevator extremely powerful. I con not use full back stick in the flare as the tailwheel will always touch first. I would be interested to hear if any other taildragger pilot has found this characteristic in their aircraft.

FROM THE FACTORY

General Information

Thanks to all of you who sent in photos of your completed PULSARS! We really do appreciate seeing the sesults of your hard work and effort. We are collecting all the photos for our "Builder's Wall of Fame" to be displayed here at the factory and at major airshows around the country. If you haven't sent in your photos yet, please do so. We want all of you included in the display as a tribute to your determination and dedication to finishing the airplane.

One of the more interesting photos we received was from Sheikh Mohamed Bin Zayed and Hussain Al Moalla. They completed 2 PULSARs and are now flying them in the United Arab Emirates! Congratulations for a job well done in what must have been difficult and challenging conditions.

Testing Rotax 582 Thermostats and Bleed Air Tubes

Flight testing continues here at the factory in a continuous effort to improve the PULSAR. Our most recent series of tests has been to evaluate the effectiveness of a thermostat in the Rotax 582 engine. The thermostat that we tested was supplied and recommended by Rotax.

What we determined from our series of flight tests was that the thermostat (as supplied) opened and closed too slowly for maintaining a consistent recommended water temperature of 140°F. In tests with our Rotax 582 powered prototype, as the engine warmed up after starting, water temperatures would increase up to 190°F defore the thermostat would open. Only then would the water temperature decrease to 140°F. This slow thermostat response was also seen in flight. After a prolonged power-off descent with the engine cooled down, adding full power to simulate a go around would result in water temperatures going too high before the thermostate would open.

The confusing thing about our test results is the fact that other PUlsar operators have installed thermostats in their 582 engines with good success. Many report very steady water temperatures of 140°F during all phases of ground and flight operations.

However, based upon our test results, we recommend that if you decide to incorporate a thermostat in your Rotax 582 installation, drill five 1/8" holes around the perimeter of the thermostat before installing it. These holes allow some water to bypass the unit which moderates the water temperature spikes. We modified our thermostat unti with the holes and water temperature spikes in our prototype moderated to acceptable levels.

Another modification to the 582 engine recommended by the Rotax factory is the installation of a bleed air tube in the water cooling system. We have also tested this modification. We soldered a bleed fitting in th filler neck just below the filler cap and connected a 1/8" clear plastic tube from it to a bleed fitting on the front cylinder head. (Rotax installs the bleed fitting on the aft cylinder head at the factory. However, we moved the fiting to the front cylinder head because that is usually the high point in the water cooling system).

The purpose of the bleed tube modification is to allow any trapped air in the water cooling system to escape to the filler cap. The results of our test show that the bleed tube will probably work as intended. It should be mentioned that in our experience with the Rotax 582 installation in the PULSAR, we have never had a problem with trapped air. However, since Rotax recommends a bleed tube, we must recommend it also. If you decide to add a bleed tube to your engine, call Phil for firther information. Either we can modify your old filler neck for you or we will send you the necessary hardware to do the job locally. If you choose to do the modification locally, please have the bleed fitting welded professionally by your local radiator shop. A leak around this fitting on the filler neck could be disasterous. Failure to carefully solder this joint will result in a collant leak which could result ina serious engine situation.

Safety Tips

Thanks to all of you who call us at the factory with suggestions and operating tips on both construction and flying the PULSAR. From our latest reports we would like to pass on to all of you the following safety suggestions:

1. **Potential Cracks in Rotax 582 Rubber Carburetor Sockets** -- One owner reported that his new sockets were full of cracks after only 30 hours of flying. We inspected our sockets with 50 hours of use and found no cracks at all. We aren't certain what caused the customer's cracks at 30 hours, but "we have been informed that the MTBE oxygenated fuel may be the cause. It is suggested that all carb sockets in the Rotax 582 installations be inspected regularly.

2. **Fuel Filter Contamination** -- Make sure to include the regular inspection of the fuel filter as part of your pre-flight inspection. A plugged filter could result in sudden engine stoppage. Always check fuel filters for contamination.

3. **Rudder Cable Clamp Bolt** -- For additional strength, we have modified the clamp bolt that connects the rudder cables to teh rudder pedals. We have changed the slot in the bolt to a hole. If you have a slotted bolt (part # AD263-A), send it back to us or just give us a call. Either way, we will immediately send replacement bolts with the holes.

4. ***Venting of the Structure*** -- It is extremely critical that all internal strctural compartments be vented to the outside atmosphere in the PULSAR. This is especially important when constructing the wing. Failure to do so could result in wing skin deformation and possible failure as the airplane climbs to higher altitudes where the outside air pressure is less. Without proper venting, air trapped inside the wing will expand as altitude increases, thus deforming the structure. Check to make sure every part of your PULSAR is properly vented. Especially check the leading edge of the PULSAR SP wing which should be vented through the wing tip to the aft ribs and eventually to the root rib vent hole. Additionally, all other PULSAR builders without wing fuel tanks should make sure that rib #1 is open in the leading edge and the aft section.

5. **Maximum Elevator Travels** -- The avility to hold the nosegear off the runway during landing roolout is important, especially if the runway surface is rough aor soft. If the maximum UP elevator travel is not set properly, elevator authority will be limited. We recommend that you check maximum elevator travelsand make sure that you can obtain AT LEAST 25 degrees of UP travel and 15 degrees of DOWN

travel. If you some reason you can't get theses values in your airplane, call Phil and he will help you solve the problem.

That summarizes the news and suggestions from the factory this month. Always remember how much everyone here at the factory apprciates each and every one of you. Thank you for buying, building and flying the PULSAR! Without you, our company would not exist.

MISCELLANEOUS

Landing Light Kits -- Larry Eubanks has asked me to clarify the price on his Pulsar landing light kit. The price of the kit is $45.00 plus $5.00 shipping. You can contact Larry at:

Route 2, Box 220E
Lawrence, Kansas 66046

Pulsar Test Pilot -- Harry Jones has contacted me with information pertaining to Pulsar flight testing. Harry utilized the services of Joe Costa to perform the first flight and test many subsequent revisions in Harry's Pulsar. Harry tells me that Joe would like to do more Pulsar testing and has asked me to pass along this information to all builders. Joe lives in Massachusetts, flies his own Cessna 150 and is happy to fly anywhere east of the Mississippi River. Harry didn't mention specific costs, but said that Joe would be very reasonable. Anyone interested can reach Joe directly at the following address:

Joe Costa
P.O. Box 67
Vineyard Haven, MA 02568
(508) 693-1614

Rotax Maintenance Videos -- Leading Edge Airfoils, Inc (LEAF) has produced several Rotax maintenance videos for use by Rotax pilots. LEAF has contacted me regarding their **Rotax Operation and Preventative Maintenance Video** which may be useful to Rotax pilots. The video is available in VHS and PAL VHS (for our foreign Pulsar builders). Pulsar builders can get a 15% discount off of the $45.00 (VHS) and $69.95 (PAL VHS) prices advertised in Kitplanes magazine. If you are interested in this video, send $38 (VHS) or $60 (PAL VHS) plus $3.00 postage to PBA. Specify which engine you have and whether you want VHS or PAL VHS.

All correspondence should be sent to:

Pulsar Builders Association
P.O. Box 13941
Scottsdale, Arizona 85267

Mike McCann, Editor

Pulsar News is published 4 times per year. Subscriptions are available for $10.00 per year (U.S.) and $15.00 (foreign). All subscriptions should be sent to the above address. Complete back issue packages are available to interested persons for $15.00 (U.S.) and $20.00 (foreign).

Pulsar News

News, Updates, and Developments for Pulsar Builders and Owners

Issue No. 22 | Published by the Pulsar Builders' Association | July, 1993

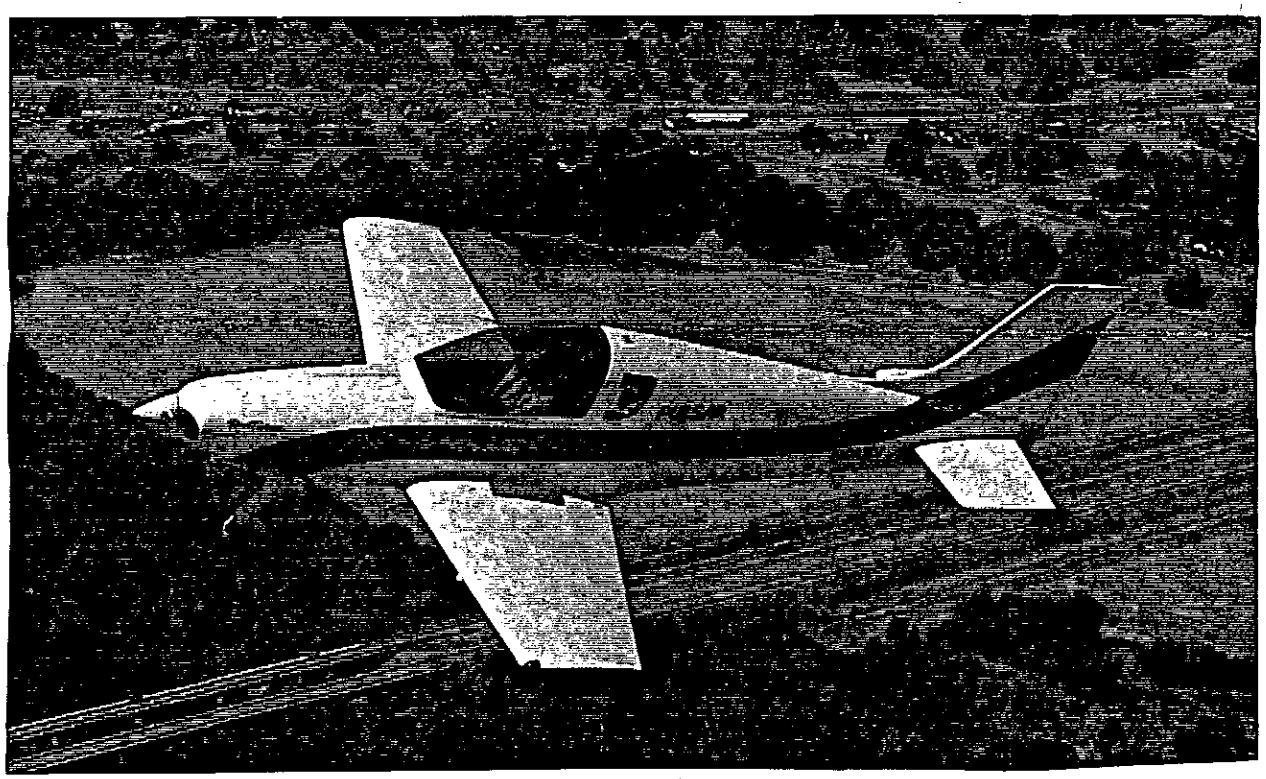
NEW NEWS

• **Back to Bi-monthly**.....Well, we've heard from a number of you concerning the switch to quarterly newsletters. The consensus was that the bimonthly format was much preferred to the quarterly mailings, so we're going back to bimonthly mailings. We appreciate the input and your thoughts. Remember, the success of the newsletter relies on input from you and we want to thank everyone who has sent us their suggestions, ideas, tips and questions!

• **Pulsar for sale** -- Jim Devorak has asked me to publish the following:

> Pulsar 582 For Sale. Oshkosh '91 Outstanding Workmanship Award. 110 TTSN. Equipped with King KX99 radio, LCA 200 Loran, Nav and Strobe lights, and larger wheels. $26,000 OBO. Jim Devorak, Glencoe MN 612-864-5162

Pulsar by Bob Vaughn -- Bob was kind enough to send us this picture of his Pulsar in flight. Bob reports that he is very pleased with the performance and enjoys flying the Pulsar whenever time allows.



• **Use of vinyl surgical/examination gloves**...Many composite aircraft builders (Pulsar and otherwise) routinely use latex surgical gloves when working with epoxy. Various articles have been published recently suggesting that this alone is not enough protection. Aero Designs continues to recommend heavier gloves (either thick latex gloves [Playtex, etc.] or butyl rubber gloves). Cotton liner gloves should also be worn to draw perspiration away from the skin.

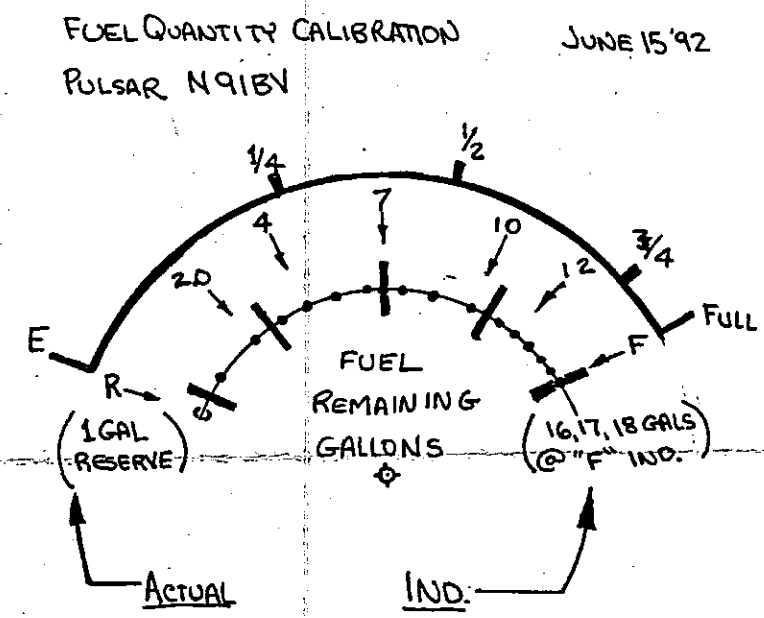
• **Cleaning with acetone**...Several composite kitplane manufacturers utilize acetone as part of the cleaning process for parts to be bonded. Aero Designs agrees that wiping aluminum parts with acetone after you prepare the surface does help to clean the part of dust, metal particles, etc. They do not recommend using acetone on composite parts as the acetone may get trapped in the pinholes. Also, be aware of the precautions necessary when using acetone since it is a nasty chemical which can cause problems for some people.

• **Coaxial cable update for Pulsar antennas**...I recently was introduced to two brands of RG-58/U coaxial cable which offer better shielding than found in the Radio Shack brand of coax. Both Beldon and Carol RG-58/U cable offers 95% shielding which may be desired by anyone wishing to take every precaution against noise on their COM radios. Check you local electronics store if you're interested in using one of these brands of coax.

BUILDER INPUT

Fuel Gages -- Bob Vaughn (Red Bluff, CA) -- You may be interested in my experience with the Skysport fuel gage system. My comments are all positive. Installation is easy, no leaks, excellent repeatability and good accuracy once carefully adjusted and calibrated. I used a 24" (bendable in the first 6" from the base) probe installed on the top of the tank forward bulkhead. The probe is shaped to extend from the top of the tank, just to the right of centerline (about even with the filler cap) to the aft lower corner, on the centerline.

My tank capacity is just a few drops over 19 gallons. I built the tank floor 5/8" lower to get a bit more range. The resultant calibration was copied and reduced about 1/3 scale and made permanently available for in-flight reference. Flight experience is limited but at least in mid-range appears to be insensitive to airplane attitude.



FROM THE FACTORY

General Information

Since the last newsletter, many positive things have been happening here at the factory. Probably the best news is that sales of Pulsar kits continues to be very strong. Seems like the word is getting around that the Pulsar is one fine airplane. Our advertisements in *Kitplanes* and *Sport Aviation* magazines are bringing in more responses than ever before. Most sales calls to the factory are from pilots and would-be pilots who simply can't afford either the initial price or the continuous operating expenses of certified production airplanes. As the costs associated with flying certified airplanes continues to skyrocket, the kitplane industry becomes more and more attractive. The future of the Pulsar has never looked better!

While on the subject of potential Pulsar customers, we really appreciate all the support many of you have been giving us lately. Most potential customers want to talk to a current builder for an unbiased opinion of the Pulsar kit and the construction process. We realize it may sometimes be an imposition, but you taking the time to visit with a sales prospect is the most effective sales tool we have. For those of you who have been called, thanks for taking the time to answer all the questions and thanks for helping us grow this wonderful Pulsar family.

Airshows

1. Camarillo, California May, 1993

As proof of the power that you have in helping us sell Pulsars, we participated at the Camarillo, CA fly-in and airshow in May using three wonderful customer built Pulsars as our display aircraft. Harry Jones, Jim King and Bill Thomas brought their Pulsars in for the two day show and were absolutely swamped the entire time they were there with people seeking information about what it was like to actually build a Pulsar. What a successful show! Potential customers were thrilled to be able to talk to actual builders instead of company salesmen. Seeing customer built airplanes was a very strong sales tool as well. This concept was so successful that we plan to do this at all future airshows. If any of you who are finished and flying would like to volunteer your time and put your airplane on display, please let Bob Kromer at the factory know. We do pay expenses and a little extra for your time and hard work. But be prepared to be busy and answer a lot of questions.

2. Oshkosh '93 July 29 - August 4

The Big One is upon us! We will be in the aircraft static display area again this year. Our booth is #646 located at the intersection of Aviation Valley Street and Stone Road. We will have Mark Burrow's beautiful "Pulsar" on display. Additionally, in our tent we will be showing the new composite wing skins, a composite fuselage and our three minute video. We will also have lots of in-flight pictures. Most importantly, we will be showing our "Pulsar Builder's Wall of Fame" which is our collection of photos of completed and flying Pulsars. Please, if you haven't sent us a picture of your completed project, try and get one to Bob Kromer as soon as possible. We want all airplanes represented as a tribute to everyone who has finished their project. We are proud of you all.

So stop by and see us if you are there. And if you have any, bring photos of your construction progress. There will be lots of people very interested in what you are doing!

3. Kerrville, Texas '93 October 15 - 17

Here is a chance to come visit us close to our home base in San Antonio, Texas. Kerrville is a lot more laid back than the other shows of the year. It is truly meant for the builder -- the airshow is minimal but there are lots of kit built airplanes on static display. If your Pulsar is flying, bring it in. It would be nice to see some finished Pulsars alongside the factory airplanes!

Information to Sport Aviation and Kitplanes magazines

We would like to encourage everyone who has finished their Pulsar to submit a nice color photo or slide along with a short, double spaced description of your airplane (build time, performance, quality of builder support, etc.) to both *Sport Aviation* and *Kitplanes* magazines. They will try to include your airplane in the sections of the magazines devoted to what is being built by subscribers and members. This is a great opportunity to show off the labors of your hard work and effort. Mail your descriptions and photos to:

1. Sport Aviation
   P.O. Box 3086
   Oshkosh, WI 54903-3086
   (include your name, address and EAA #)

2. Completions
   c/o *Kitplanes*
   P.O. Box 6050
   Mission Viejo, CA 92690
   (include your name, address, and day phone #. Your submission also enters you in a drawing for a Bendix/King KX99 handheld nav/com).

Pulsar Wins Award In South Africa

Adrian Vermooten, a Pulsar builder and Dealer in South Africa, wrote recently with very exciting news. His Rotax 582 powered Pulsar won awards for 1) Best Composite aircraft, 2) Best Finished Aircraft, and 3) Grand Champion Aircraft-1993 at the huge Margate airshow in Margate, South Africa. There were 420 aircraft at the show, so Adrian had some real competition! Adrian has been a tremendous booster for the Pulsar and his recent awards prove his commitment to the construction and promotion of these wonderful flying machines. Congratulations, Adrian! Maybe someday you can make a "short flight" to the U.S. so we can see your airplane!

Safety Tips

Several tips and suggestions have come to the factory since the last newsletter. We appreciate all the comments from you. Keep them coming. Together, we can make the Pulsar even better!

Here are this period's factory tips and suggestions:

1) Prop Spinner Security -- Spinner security is very important. To verify your prop spinner is secured properly, make sure to accomplish the following: a) Any time the spinner is removed, use new locknuts when replacing it. Re-using the old locknuts can cause the attachment screws to loosen and back out; b) Maintain a bead of silicone sealant in the space around each prop blade where it exits the spinner. This silicone sealant "bridge" between the blades and the spinner

cutouts will help stabilize the spinner and reduce vibration and stress on the attachment screws; c) Verify that the stiffening of the spinner backplate has been accomplished per the note at the end of the prop and spinner installation section of the Engine Installation Manual. This is accomplished by bonding a ring of 1/4" composite flat panel material to the back of it.

2) Fuel Sight Tubes - Rotax 582 Powered Pulsars

Make sure and regularly check your panel mounted fuel sight tubes for cracks. If a crack does develop in the sight tube, a fuel leak will soon follow. In some areas of the country, the additives in the auto fuel attack the tubing material and makes it brittle. So, regularly check those tubes for cracks!

3) Bleed Air Tube Condition in the Rotax 582 Water Cooling System

In the April, 1993 Pulsar Newsletter (#21), we discussed the installation of a bleed air tube in the water cooling system. Rotax recommends this installation in the 582. If you have installed this tube, make sure you use the tubing we send with the kit or use only urethane tubing. DO NOT USE PVC OR VINYL TUBING. It will eventually burst under the heat and pressure of the coolant system. All of the engine coolant will then leak out. Inspect your installation for the use of the proper type of tubing.

4) Tailwheel Steering Spring Tension

Several builders who are flying Pulsars with conventional landing gears have reported that it is almost impossible to stretch the steering springs the recommended 1 inch. The springs just have too much tension for this large of a stretch. We agree. The new recommended stretch distance for the steering springs is 1/8" to 1/4".

5) Flap Actuator Arm

The flap actuator bellcrank pilot holes are mislocated from the factory. Ignore the pilot holes and drill the bellcranks at the center of the flap torque tube. When you drill the holes, keep the bellcrank "saddled" tight against the torque tube.

6) State Sales Taxes

We have been reminded that most states are now actively searching out and collecting sales and use taxes on Pulsar kit purchases. Remember, if you live outside of Texas, you do not owe a states sales tax here on your Pulsar kit. However, you are legally required to declare the purchase in your state of residence at the time of purchase. Failure to do so could result in not only future collection of taxes from your home state but also the collection of some pretty stiff penalties as well.

That pretty well summarizes what has been happening at the factory since the last newsletter. We hope to see many of you at this year's EAA airshow in Oshkosh during the July 29 - August 4 festivities. In the meantime, keep those Pulsars building and flying!

MISCELLANEOUS

Rotax Maintenance Videos -- In issue #21, we mentioned that Leading Edge Airfoils, Inc. offered Rotax maintenance videos to Pulsar builders at a discount. After #21 went to press, we had the time to watch the videos for quality and content and we were very disappointed. Most of the video doesn't talk about the 582 engine (nothing about the 912). A couple builders sent checks for the video, but we returned the check with an explanation that the value to Pulsar builders just wasn't there. If any builder does find information of value to Pulsar builders, let us know and we'll pass it along to everyone.

Builder Input -- Many thanks to those of you who have recently sent in information pertaining to construction hints and tips as well as performance updates. Most of issue #22 was written before we went through the mail, but don't despair! Your input will go into issues #23-24 and thanks again for your valuable information. I regularly receive letters from builders who appreciate the builder input and value their suggestions.

All correspondence should be sent to:

Pulsar Builders Association
P.O. Box 13941
Scottsdale, Arizona 85267

Mike McCann, Editor

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Pulsar News

News, Updates, and Developments for Pulsar Builders and Owners

Issue No. 23 | Published by the Pulsar Builders' Association | September, 1993

BUILDER INPUT

Ken McWhinney: Rotax Bleed Nipple & Radio Interference

1) **Bleed Nipple** -- Since my Pulsar was constructed as a taildragger, I would like to confirm that I have connected my bleed nipple to the front cylinder of my Rotax 582. What concerns me is that the cylinder head nipple is much higher than the filler neck nipple and if someone attempts to fill the engine with coolant without lifting the tail, this venting system will be useless.

2) **Radio Interference** -- I have read about some builder problems with radio interference and perhaps my experience may have some value. On my first flights, I used a KX99 handheld with some success. When I was close to a station (tower), I had some interference, although by and large, it gave reasonable results. As I got further away from the station, I got progressively worse reception including severe background noise which appeared to be, or probably was, electrical interference from the engine.

In the British Isles we are required to fit a metal firewall and I grounded all my electrical components to this which seemed to help. Since then I have fitted a brand new KX125 NAV/COM and again the metal firewall has been used as a ground.

A thin shim copper strip has been bonded to the inside of the luggage compartment as a ground plane and all antennas are internal, fitted in the rear fuselage and made from thin copper shims (copper foil tape). I can confirm that this has given me excellent results, and is even better than the King radios in my Mooney.

One thought which occurs to me is the wavelength and position of the antennas may have some bearing on the interference. Perhaps some builder qualified in avionics may solve this problem.

Harry Jones: Amsoil in Rotax Fuel & In-Flight Mixture Control

1) **Amsoil** -- I have been using Amsoil in my 582 since 10/18/91 at the specified fuel-oil ratio of 100-1. The engine log shows 75.4 hours since then and includes an uneventful trans-continental trip. The plugs have been changed once just for this long trip. The present plugs have now about 45 hours on them and still look good. My pre-take off mag check shows a drop of about 150 RPM on each coil. Prior to using Amsoil, I changed or cleaned plugs every 12 hours using AV-2 and every 25 hours using Pennzoil. A recent top-end inspection of the pistons and rings showed clean rings and grooves with no brown stains or black deposits visible on the pistons below the rings or elsewhere. A dusty grey-brown deposit on the piston faces could be scraped clean with ease and was not thick enough to chip or measure. The machining lines on the piston sides and the herring-bone scoring on the cylinders look like new.

Fuel consumption has dropped from 3.8 GPH to about 3.5 GPH at approximately 5800 RPM. Static run-up max RPM has increased about 200 RPM and an increase in performance has also been

noted. I use Amsoil in the valve oil chamber also. All this has produced many pluses. In general, the engine runs better and sounds better. I believe there is less vibration. No longer do I fuss with cleaning the plugs. There is less less variation in performance also.

I experimented with the possibility that Amsoil would settle out of gasoline if permitted to stand for long periods. I filled a glass jar with gas and poured 1% Amsoil on top. The oil sank directly to the bottom. Then two or three up-and-down shakes of the closed jar caused complete dispersion. I set the jar on a shelf in my unheated hanger. After 3 months there was no change; no sign of the slightest scum on the bottom.

The 100-1 mix meant that I needed to carry only one gallon of oil on my trans-continental trip instead of two. A quart is sufficient for most cross country flights. Since I frequently fly into fields without auto-gas, I carry two empty 6 gallon plastic gas cans under my baggage shelf (vented to the outside) and a small measuring cup which fits inside my filter-funnel unlike the big old "Ratio-Rite". I shake the gas can just before fueling and I stop when about 2/3 gallons of fuel remains. Now I can shake up lots of turbulence before pouring in the remainder.

I started the Amsoil test immediately after a top overhaul of the 582 thus starting with a clean engine. The previous 70 hours had carboned the rings nearly to the point of seizure. I see no reason not to continue using Amsoil because it saves a great deal of time which I used to spend fussing with the engine. Amsoil is sold through private individuals acting as dealers. Be sure to specify Pre-mix or Injection formula. Look up Amsoil in the white pages of your telephone book.

> Note: Aero Designs has questioned Rotax about the use of Amsoil and Rotax has stated that they have not tested Amsoil but they don't think that 100:1 oil ratio is sufficient to adequately lubricate the engine.

Factory Notice:

Due to the inherent risks associated with mixture control on two-cycle engines, and the fact that we have not tested the Jacoby Mixture Control System described in the following builder article, Aero Designs can not endorse the use of this system. Harry Jones is a very talented engineer with a proven record of safety-minded testing. His success with the Jacoby system should not be considered an indication of success in other installations.

2) **In-flight Fuel Mixture Control** -- Did any of you see the article on the July, 1992 Experimenter by Mike Jacober on his mixture control system? In late August, 1992 I had Mike modify my carburetor slides and jet-needles so that I could install this system. I'm quite happy with the results. All effects on engine operation noted to date are improvements. Previously, I had difficulty maintaining a proper mixture sufficiently to keep the plugs clean and the engine putting out full power on all flights. In my trans-continental flight, I'm sure that I would have had detrimental plug fouling had I not been using Amsoil at 100-1. After hours at 10,500' my plugs were black without a hint of that good brown color, but not fouled. If I had had a mixture control, I would have had better performance and increased range.

Jacoby's system adjusts the jet needles up and down in the slide-barrels with two control knobs in the cockpit. This produces full mixture control in the mid-range from 1/4 to 3/4 throttle. Dual EGT gauges are required as the only way to monitor the mixture of each carburetor. Just turn on the knobs one turn and watch the EGT of that Carburetor change 10 or so seconds later. This ability to control mixture on each carburetor not only allows one to adjust for altitude, saving fuel and keeping plugs clean, but also to run at the optimum 1150° or 1175° without ever running over 1200°. My static run-up RPM has increased from 6200 to 6500 or 6800 with

commensurate performance improvement. My plugs are uniformly a reddish brown. My fuel consumption has dropped from 3.5 GPH to 3.1GPH or less. (A longer record of fuel usage is required to determine how much less). One thing is sure: I'd never give up my mixture control. And it is so elegantly simple. One caution: Jacober's instructions did not emphasize that the jackets of both the new cables and the existing throttle cables must be held down securely to the carburetor caps to prevent throttle problems.

FROM THE FACTORY

General Information

Since the last newsletter, things have really been very busy at the factory. Especially active has been the foreign marketplace. Orders from Germany, New Zealand, Italy, Slovakia and Argentina have kept us busy these last two months.

We have also been busy finishing the tooling for a brand new option. We are now offering all composite wing skins as an option to replace the birch plywood wing skins of the standard kit. The composite wing skin option consists of new wing ribs and four composite sections per wing - two leading edge cuffs, an upper surface cambered panel and a lower surface cambered panel. When these four preshaped and premolded panels are bonded over the underlying wing structure, the wind is completely skinned and ready for final exterior finishing. Structural integrity is unchanged - the composite skins and the wood skins have the same structural strength. However, the primary advantage of the composite wing skin option is saving build time. At least 100 hours will be saved by using the composite wing skins.

If any of you have not started constructing your wings and would like to have the composite wing skins, let us know. Price for the composite wing skins option will be $1,850. If you decide to order the composite skins, expect a three month delivery time. We have been overwhelmed with orders and are working overtime to make up the backlog.

It seems we say it in every newsletter, but again we want to thank all of you who take the time to talk with prospective Pulsar customers either on the telephone or in person. Your enthusiasm and positive comments about your Pulsar building experiences are absolutely the best sales promotion Aero Designs could ever have. All prospective customers expect a sales pitch from us, but when they hear it from you it is much more meaningful. For all of you who have taken your valuable time to talk to someone who is considering a Pulsar kit, everyone here at the factory says THANK YOU! Always remember how much all of you mean to us.

Marketing Report - Oshkosh '93

What a show! Aero Designs was located in its usual place at the intersection of two major streets in the aircraft display area. We had an incredible amount of walk through traffic during the show. 5300 pieces of promotional literature were dispensed from our display this year! We had a 10' x 30' tent with a composite fuselage and a composite wing inside. Mark Burrows was kind enough to allow us to use his beautiful conventional geared Pulsar as our aircraft static display next to the tent. On the flight line, Pat Keesler had his wonderful Pulsar on display. Both Mark and Pat worked many long and hard hours answering all kinds of questions from potential customers. To both of them, we want to say again, THANK YOU.

After the show was over, we all went to the EAA aircraft judging ceremony thinking the excitement was over. Were we ever wrong! Both Mark Burrows (Independence, MO) and Pat Keesler (Neenah, WI) won very significant awards for their Pulsars. Mark won a bronze Lindy award for outstanding kit built airplane. Pat won the award for outstanding workmanship in the

kitplane category. Talk about excited! Take that Glasair and Lancair! You don't have to spend megabucks and a lifetime of weekends to build a beautiful airplane. Just buy and build a Pulsar.

Next year we hope as many of you who can make it will fly your Pulsars to the show. It will be a lot of fun to see a fleet of flying and finished Pulsars on the ramp at Oshkosh '94. We will be planning some special activities for all Pulsar pilots and builders who attend next year. You will be hearing more about this later. But for now, mark you calendars for July 28 through August 3, 1994 and plan to see us in Oshkosh.

Builder's Conference Sponsored by Kitplanes Magazine

In several locations in the U.S. and Canada, Kitplanes magazine has been sponsoring Builder's Conferences. These conferences give potential customers the chance to visit and talk to factory representatives as well as to actual builders who have finished and are flying kit built airplanes.

We have not been participating in these conferences because of the great distances involved in flying from San Antonio to them. However, this has not been the best for our company. The ability to talk to so many interested potential customers in one location is hard to pass by.

There are three conferences scheduled for the remainder of 1993. They are in Toronto, Ontario, Canada on September 18; Hartford, Connecticut on October 9 and Lakeland, Florida on November 13. What we would like to propose is that if any of you who are finished and flying your Pulsar would like to participate in these shows as factory representatives, we would certainly be willing to pay for your work and efforts. Your efforts would involve flying your Pulsar in for the conference, spending the day at the show answering potential builders' questions and putting your airplane on static display. No demo flying would be involved.

If any of you are interested and willing to help with this sales effort, please contact Bob Kromer at (210) 308-9332 or (210) 308-5915. Again, we will be willing to compensate you for your efforts and hard work.

Photos and Information to the Magazines

Again, if you have not sent us a nice color photo of your completed project, please do so. We would really like to have your airplane presented with the others who have finished. We call this display the Builders' Wall of Fame. We displayed this photo collection in the lobby and take it to all major airshows. We are proud of all of you. Let us show off the results of your hard work.

Also, don't hesitate to submit your completed photos and a brief description of your Pulsar to Kitplanes and Sport Aviation. They are hungry for kitplane completions to include in their magazines. If you want to show off your Pulsar, there is no better place than these two magazines.

New Sales & Construction Video

We finally have a sales and marketing video on the Pulsar! We finished the final editing in the studio on Thursday, September 9. The VHS tape runs 23 minutes and is full of beautiful flying scenes with both a Rotax 582 powered Pulsar and a Rotax 912 powered Pulsar XP. Additionally, the tape has approximately 6 minutes of construction and building scenes demonstrating the composite construction techniques used in the Pulsar kit.

The tape sells for $15. If you would like a copy, send us a check and we will immediately mail you one. We think you will really enjoy the show and will be even more enthusiastic about your Pulsar project after seeing it in action.

For those of you who are members of local EAA chapters and are willing to show the video at an upcoming EAA chapter meeting, call or write us with the chapter number where you will be showing the video. We will then send you a copy of the video tape and some promotional material to hand out AT NO COST. Helping us to promote the Pulsar in this manner would really be appreciated and giving you the tape at no cost is our small way of saying thanks.

International Marketing News.

• New Dealer for Germany

We are extremely pleased to announce the appointment of Frank Vervoorst as the Pulsar dealer for Germany, Austria and the Netherlands. Frank is a very experienced kit airplane dealer, salesman, and builder. Frank can be reached at Tel: 011 49 221 5 95 16 95 or Fax: 011 49 221 5 95 15 95. He has already ordered two Pulsar XP kits. Good luck and welcome aboard.

• New Dealer for Slovakia

Emil Horoscak, a Pulsar builder who is flying in Bratislava, Slovakia, is now a Pulsar dealer for that country. Emil's company, S.E. Trading, Ltd., can be reached at Tel: 011 42 7 37 6837 or Fax: 011 42 7 31 6673. Welcome Emil.

• Two New Flying Pulsars in France

Two new Pulsars in France have joined the ranks of finished and flying airplanes. Our French dealer, Jean Luc Boudard, completed the first flight on his Pulsar on August 17. This first flight is very significant because it follows a very involved approval process by the French authorities.

Also flying in France is Jacques Tellier. He recently completed the approval process and is operating his Pulsar in French airspace. Congratulations guys.

Safety and Builders' Tips

• Setting Pitch Angles on the GSC Propeller

We have started sending propeller blade pitch angle templates with all ground adjustable GSC props. These templates give you optimum blade angles for performance. However, for all Rotax 582 customers, keep in mind that these templates are set up for the current 2.238:1 prop/engine gearing ratio. If your 582 engine has the original 2.0:1 ratio, DO NOT USE THE NEW TEMPLATE. USING THE NEW TEMPLATE WITH A 2.0:1 GEARING RATIO ENGINE WILL RESULT IN IMPROPER PROP BLADE PITCH SETTINGS.

While on the subject of setting propeller blade pitch angles, the GSC ground adjustable propellers that are standard in the Pulsar kits come with a pitch setting instrument that is rather difficult to use. Accurate blade pitch angles are difficult to obtain with this particular instrument. Remember, accurate blade pitch angle settings are very important for smoothness and good airplane performance. For optimum performance and comfort, each blade should be set within 1/2 degree of each other.

If your desire is to obtain excellent levels of blade pitch angle accuracy, we highly recommend purchasing and using the bubble type protractor instrument sold by another propeller manufacturer - Warp Drive. Their blade adjustment instrument is very accurate, easy to use and

we highly recommend it in place of the instrument provided by GSC. To order the protractor, call Warp Drive at (515) 357-6000. The instrument costs about $20.

• Eliminating A source of Vibration

After changing the nosewheel on Rick Meyer's Pulsar XP here in San Antonio, we noticed a high level of vibration IN FLIGHT. We couldn't figure this out. How could changing a nosewheel increase the level of IN FLIGHT vibration? We flew another Pulsar alongside and quickly found out!

Seems this new nosewheel was badly out of balance. In flight, the airflow over the tire (with the fairing installed) causes the wheel to spin very fast. We did not consider the nosewheel could spin in flight on the Pulsar. With the nosewheel out of balance, the whole airplane shook! Most nosewheels seem to have enough friction in the bearings to keep the nosewheel from spinning in flight. Not this one.

We recommend that you take the time to balance your nosewheel, especially if you have noticed any unusual in-flight airframe shaking. You can balance the nosegear *with adhesive-backed lead* strips available from most auto supply stores.

• Correction of the Fuselage Construction Manual

One of our very astute builders noticed a typo on page 51 of the fuselage construction manual. The dimension on page 51 should be 35 3/4" instead of 35 1/2". This typo must have crept in during the last revision since we have not noticed it before. However, the dimension is not that important as long as you come out with 1/8" clearance between the rudder and the top of the fuselage.

Thanks to everyone who calls or writes us with suggestions or corrections to the manuals. Our goal is to have the clearest and most precise construction manuals in the industry. With your continuing help, we can accomplish that goal.

That completes our factory news update. Keep building and keep flying! Remember, we are only a phone call away. We can be reached at:

Builders Telephone:	(210) 308-5915
Sales Telephone:	(210) 308-9332
Fax:	(210) 308-9329

All correspondence should be sent to:

Pulsar Builders Association
P.O. Box 13941
Scottsdale, Arizona 85267

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Pulsar News

News, Updates, and Developments for Pulsar Builders and Owners

Issue No. 24 | Published by the Pulsar Builders' Association | November, 1993

MISCELLANEOUS

• Pulsars for sale --

Pulsar 582 For Sale. Oshkosh '91 Outstanding Workmanship Award. 117 TTSN. Equipped with King KX99 radio, LCA 200 Loran, Nav and Strobe lights. $24,000 OBO. Jim Devorak, 1014 Knight Avenue, Glencoe, MN 55336 (612)-864-5162

Pulsar 582 For Sale. Includes Flybuddy Loran, COM Radio and encoding transponder. 61 TTSN and painted in light cream. $22,500. Bill Thomas 792 El Rancho Drive, Livermore, CA 94550 (510) 447-1995

• Address Changes --

Recently, we have had a number of Pulsar newsletters returned due to invalid addresses. Be sure to let me know what your new address will be when you move so we can keep sending the newsletters to you. Although some of you may notify the factory of an address change, I am not always aware of the change. You can notify us at the address shown on page 6. Thanks for your help. Mike

• Parts Discounts for Pulsar builders --

Marc Kenyon has contacted me regarding his company, Microflight Products, Inc. Microflight sells a wide variety of sport aircraft supplies and also is a certified Rotax repair center. Marc offers a 10% discount on all products purchased by Pulsar builders. Be sure to ask for Marc when ordering. Their address and telephone is: 16141-6 Pine Ridge Road, Ft. Meyers, FL 33908 (813) 454-6464.

• Price Increase on Rotax Engines and Parts

Aero Designs has just been notified by Rotax on a scheduled price increase to take effect 12/23/93. The increase is 4.3%. Any Pulsar builder wishing to purchase a Rotax engine or supply parts before the increase must have their check to Aero Designs no later than 12/23/93. Please call Aero Designs if you have any questions regarding the price increase.

• Pulsar Hats

While we're on the topic of price increases, Pulsar hats now cost $8.50 (plus $1.50 shipping) due to price increases from the hat manufacturer. The upside is that the new hats look even better!

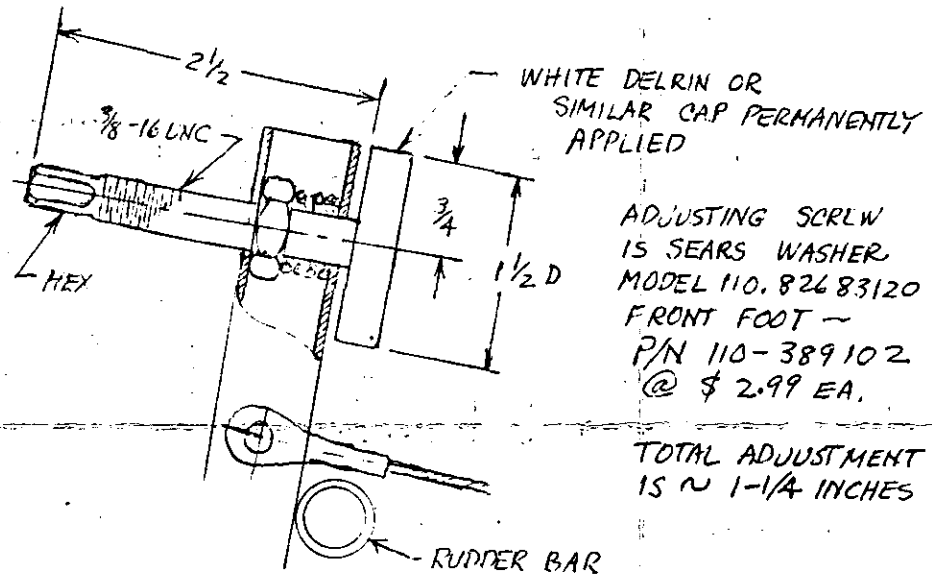
• **Rotax 582 Operating Tip --**

The September, 1993 Kitplanes magazine had a brief note regarding the Rotax 582 rubber sockets. I thought the information was worthwhile to reprint here:

> "As with most models of Rotax two-stroke engines, the carburetors on a Rotax 582 are attached to the intake manifold with a rubber socket, and these sockets occasionally crack or break, sometimes leading to engine failure. Leading Edge Airfoils (LEAF) of Colorado Springs--one of the leading distributors of Rotax engines in the United States--says this service tip should extend the life of the rubber sockets:
>
> *Before installing new parts on your Rotax 582, wipe the mounting flanges on the engine, inside the clamps, and inside and outside the sockets with acetone (LEAF Part No. K6810). Install the sockets, clamps and carburetors. Lightly wipe the exposed rubber surfaces with silicone-dieletric grease (LEAF Part No. H4382). This has been tested under operating conditions and has greatly extended the life of these parts. DO NOT USE A SPRAY, which can migrate under the clamps. Be sure to tighten them before grease is applied."*

BUILDER INPUT

Wayne Johnson (Emmaus, Pennsylvania): The following is my suggestion for an adjustable brake pedal which I've installed on my Pulsar 582 taildragger #246:



This unit adjustable by hand using a standard 3/8" nut and strong, short coil spring selected from the local hardware store spring assortment. A nylock nut is too tight and would require a wrench on the hex end to adjust. Only one 3/8" drill hole is required at 3/4" from the top of the brake tube.

FROM THE FACTORY

General Information

Since the last newsletter, several new Pulsars have taken to the skies for the first time! Congratulations to:

Bob Murowski	Bob has completed a successful first flight on his Rotax 582 powered Pulsar in Pennsylvania.
Ray Louks	Ray has flown his Rotax 912 powered Pulsar XP in Florida.
Bill Conrad	Bill has flown his 582 powered Pulsar in New Jersey.
Santiago Ramos	Santiago has flown successfully in his 912 powered Pulsar in Madrid, Spain.

Service and Parts Support for Rotax Engines

Many of you have called wondering where the best service and parts information is on the Rotax engines. Our experience has shown that the three following companies do an excellent job of supporting your Rotax questions and service needs:

California Power Systems, Inc.
790 139th Avenue #4
San Leandro, CA 94578
Phone: (510) 357-2403
Fax: (510) 357-4429

CPS has an excellent service and support group that can answer all of your questions on the Rotax 582 or 912. They also stock all the parts you might need. They also have an excellent parts and service catalog that is now included in every new Pulsar kit we ship. If you want a copy of this catalog, call CPS for a copy. It is $6.95, including shipping and is an excellent source of service and parts information on Rotax engines.

Green Sky Adventures
2377 Cream Ridge Road
Orwell, OH 44076
Phone: (216) 293-6624
Fax: (216) 293-6321

Green Sky is another company with good all-around service and maintenance support.

Leading Edge Airfoils, Inc.
331 South 14th Street
Colorado Springs, CO 80904
Customer Service: (719) 632-4959
Orders Only: (800) 532-3465

LEAF is a "one-stop" parts and service center for all of your Rotax needs. They also have a great catalog for $6.00.

Aero Designs Builders' Support Program

Always remember that we encourage you to call us at the factory if you have any questions during the construction of your Pulsar. Rick Meyer, Phil Durieux, John Hutson or Mark Brown will be available to help you through any difficulties you might encounter.

To help us maintain the highest level of builder support, we have several suggestions. First, call us early before you cut or bond anything questionable. It is always easier to solve a problem early before it gets too far along. An early call to us can save lots of "undoing" later.

Second, try to keep your questions short and to the point. A lengthy discussion can tie up the phones for a long time. Try to think about what you will ask before you call. That way, time will be saved and the next builder's questions can be handled.

Third, if you have a proposal to modify the Pulsar in any way, we request that you send the proposal in writing rather than talking about it over the telephone. Mark will need to see the proposed modification in writing to better understand it. A conversation over the telephone leaves too much risk for misunderstanding which could lead to a dangerous condition.

With your help, we can continue to offer the prompt and precise builder support that you deserve and we strive to provide.

Pulsar Improvements & Suggestions

1. Slotted Hole in the Primary Flap Torque Tube

In several high time Pulsars (500-600 hours), we have noticed that the slotted hole in the flap torque tube is tending to wear enough over time to cause flap deflection to be affected. On our prototype, we could get only 30 degrees of flap deflection instead of the original 40 degrees.

To avoid this condition, we now suggest that you do not slot the hole in the primary flap torque tube. Not slotting the hole will eliminate the wearing of the hole. The current construction manuals have been revised to incorporate this recommendation. If you already have slotted the hole on your Pulsar, no problem. Just rotate the torque tube 90 degrees and drill a new hole.

2. Elevator Leading Edge Closeout Strip Inspection

During a routine inspection on one of our customers Pulsars, we discovered that the leading edge closeout strip on the right-hand elevator had cracked loose from the lower elevator skin in the area around the elevator torque tube. The cause of this crack was due to the builder inadvertantly sanding away the corner where the closeout strip meets the lower skin.

It is suggested that you inspect this same area on both elevators of your Pulsar. If you find a crack, call us at the factory for instructions on how to repair it. If you don't see a crack but the corner where the closeout strip meets the skin is sanded away, you will need to wrap one layer of 3 oz. glass around the corner for proper strength in this area.

A suggestion for avoiding this situation during the construction of the elevators is to recess the leading edge close out strip 1/16" away from the edge of the elevator skin. This will insure that you have a completely bonded joint that can not be sanded away.

3. Control Surface Gap Taping

For purely aesthetic purposes, we install white vinyl plastic tape over all of our control surface hinge gaps. If you choose to do this, remember to hold the control surface in the full DOWN position as you apply the tape. If you don't do this, the tape could restrict full travel limits of the flight controls since it does not stretch very well over its full span.

4. Structural Venting

We again want to emphasize the importance of making sure that all closed structural compartments inside your Pulsar are properly vented to the outside. As you close out each structure, make sure that all closed compartments have a vent path to the outside atmosphere.

5. "Soft Ride" Nosegear Spring

In response to several requests for improving the flexibility of the nosegear, we have recently developed and introduced a shock spring installation that really improves the smoothness of the nosegear when operating from bumpy runways.

The shock spring directly replaces the solid drag brace in the nosegear. However, the hole in the lower cowl must be opened up to about 1.75" by 2.25".

If you would like to order this nosegear spring for your Pulsar, send us a check for $95. Mark on the check that it is for the "nosegear spring". We will send out your spring as soon as possible. However, our inventory is limited. If we get several orders at once, your spring could take several weeks to deliver.

6. Prop Strikes on Nosegear Fairing

We are aware of a ground operating incident where a spinning prop struck a nosewheel fairing on a Pulsar. What happened is that the nosewheel was allowed to swivel 180 degrees while pushing the airplane backwards by hand prior to engine start. The nosewheel was then left in this "backwards" position. When the engine was started, the spinning propeller came into contact with the nosegear fairing.

To keep this from happening, make sure the nosegear is allowed to swivel back to the proper forward facing position after pushing the Pulsar around by hand on the ramp.

Information to Sport Aviation and Kitplanes magazines

Once again, we would like to encourage everyone who has finished their Pulsar to submit a nice color photo or slide along with a short, double-spaced description of your airplane (build time, performance, quality of builder support, etc.) to both *Sport Aviation* and *Kitplanes* magazines. They will try to include your airplane in the sections of the magazines devoted to what is being built by subscribers and members. This is a great opportunity to show off the labors of your hard work and effort. Mail your descriptions and photos to:

1. Sport Aviation
   P.O. Box 3086
   Oshkosh, WI 54903-3086
   (include your name, address and EAA #)

2. Completions
   c/o Kitplanes
   P.O. Box 6050
   Mission Viejo, CA 92690
   (include your name, address, and day phone #. Your submission also enters you in a drawing for a Bendix/King KX99 handheld nav/com).

1994 Sun N' Fun Airshow -- April 10-16, 1994

This is the next big airshow for Aero Designs. We hope to see many of you there this year. Our display will be expanded to include two airplanes on display in addition to our tent.

One thing we have learned in the past is that there is nothing like having actual builders and customers help us at the major airshows. Potential customers really appreciate and enjoy the opportunity to talk to someone who is actually building a Pulsar.

If any of you would be willing to help at the Pulsar booth this year, please call Mark Brown (210) 308-9332. We will pay you for your time spent helping us. This will help defray some of your expenses in attending the show.

That is all we have from the factory. Keep building and flying. Remember, the only reason we exist be because of you!

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