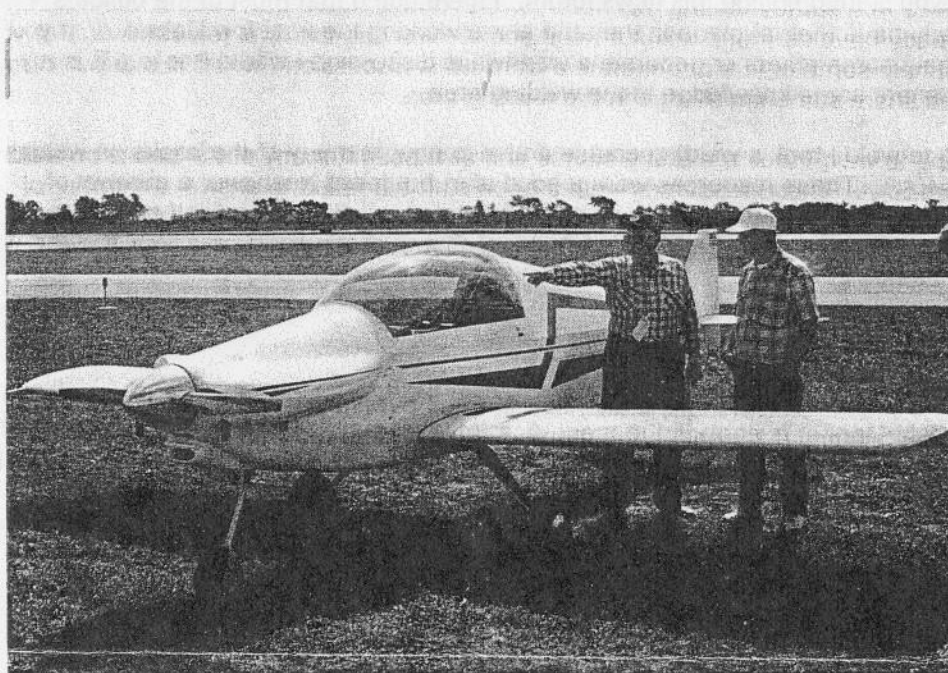


# SONERAI

Jan-Feb-Mar 1996

NEWSLETTER



## Jim Stanek (on the right) and his Sonerai II LTS at the 1995 North Central Fly-In at Sterling-Rock Falls, Illinois

Welcome to the January 1996 issue of the Sonerai Newsletter. This is the 34th issue to be printed, which is rather surprising to me since this was intended to be an interim project. Fred Keip is now on board officially as Co-editor as you will see from some of the correspondence in this issue. We are kind of like Batman and Robin ( or Sky King and his niece Penny), but it will probably take a while to find out which one of us is which one of them. Bear with us for a bit. Fred's address and mine can be found on the cover page of all issues. I assume that we will be telling each other of any important letters or phone calls that come in.

Some of you may have noticed that there wasn't a two page "Notice of Intent to Commit Re-Up for 1996 " sent out at the beginning of Dec. 95. Since everyone got the first issue of 1996 anyway, I decided to just put a Re-Up notice in this issue. So here it is. Even though the Sonerai Newsletter now has two hungry mouths to feed, it is still \$12.00 per year (\$15.00 overseas). Check payable to " Sonerai Newsletter". Please don't send goats or chickens anymore. The address is --- 412 S. 5th Delavan, WI 53115.

Sun N Fun is only 4 months away -- Any plans for the event???

Dear Ed,

I am busy building a Sonerai II and have finished most of the welding on my fuselage except the tail parts. My purpose in building the Sonerai is for the learning experience and the satisfaction of watching a carefully crafted airplane come together. I have been reading the Sonerai News on and off since you started editing this news forum. I have noted that most of the builders writing in already have their airplane in the air and are working the final few kinks out. If you think it might help some others or generate a worthwhile discussion I would like to put in my 2 bits worth and share some knowledge in the welding area.

Before starting to weld I took a welding course and also bought many of the books on welding available from EAA. These resources were a good start but failed to answer a number of questions specifically related to welding up an aircraft fuselage. I found myself seeking out advice from local chaps in my area to fill in the gaps. Some of the question asked and the answers are as follows:

1. What welding rod to use?

Monnet says to use mild steel in my plans, however not everyone agrees with this wisdom. My research suggests Monnet is right on the money. A mild steel rod with a diameter of 1/16 th of an inch works well. Some of the literature available says to use a chrome moly rod (particularly if you talk to a welding shop). The reasons to use mild steel are as follows;

- it is easier to weld.
- you get a migration of the alloys in the tubing to the mild steel through the puddle increasing the strength of the joints.
- the material thickness in the joint is always much thicker than the tubing (although chrome moly is about 50% stronger than mild steel the greater thickness more than makes up for the lower strength of mild steel).
- the weld is more ductile with mild steel (more give, less breaking).
- if you try to break a joint, failure will occur at the intersection between the joint and the tubing. A mild steel rod gives us home builders the best chance of maintaining maximum strength in this critical area.

2. What gap should be left between the parts to be welded?

The thickness of the rod 1/16th of an inch.

3. What tip to use?

I had to experiment. The sizes available in the original welding kit I bought were too big. I later purchased a "Uniweld number "00" which seems just right.

4. How do I weld a joint once it is tacked?

Do the welding on each piece of tubing in 4 parts, each part takes you 90 degrees. Start in the crotch of the joint and weld around 90 degrees and stop. Turn the part over and weld on the opposite side, once again starting at the crotch and going just 90 degrees. Complete the final 2 welds similar to the first 2.

5. In what order are the clusters welded?

Tack as much of the fuselage as possible together on a table. Invent a rotisserie to put the fuselage on so it can be rotated as the welding process progresses. Some of the joints are hard enough for us weekend welders to do a pretty job on, never mind if you have to stand on your head to get at the joint. Back to the original question. Start at the first station at the firewall and weld the entire first station one cluster at a time, proceed to the next station towards



the tail again doing an entire station before going on to the next station. Pick any one of the four clusters to start with at the first station. Proceed in welding in a clockwise direction at each station. A counter-clockwise direction is OK but be consistent and maintain the same direction for each station. The first cluster to do at the second station is one directly behind the very first cluster started. An entire cluster is welded at once. A string can be run down the fuselage from station zero to the tail so you can watch the fuselage wander all over as it is welded. I was amazed how straight the fuselage was once I had reached the tail.

6. What direction is easiest to weld on vertical surfaces?

Welding uphill seems to be the easiest for me.

7. What other special things should be done that are specific to 4130?

4130 is not tolerant of rapid cooling or quick heating. Always preheat the surface to be welded. This means taking 10 - 15 seconds to slowly bring the torch toward the material playing the torch around the area to be welded. Reverse the procedure as the weld is finished. Bringing the torch quickly away will cause the crystalline structure to be slightly different and will cause oxidation on the surface of the tubing. Monnet, in his plans, recommends normalizing the joints, you can read about it there.

8. Is there anything else that is important?

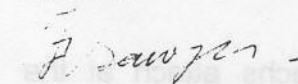
Yes, good welding technique. There are lots of good books around that cover gas welding. Find one, practice and find a good coach. The hardest part for me though was finding the courage to pick up the torch and make the first weld on the airplane.

Ed Re: Subscription to Sonerai News .

Please send me whatever back newsletters you have available (my last one says 1992 on it), and put me on the list for 96.

Thanks for taking the time to answer my questions about tubing thicknesses the other day.

Yours truly



Frank Sawyer

Frank Sawyer  
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Canada

**The following is submitted by Harry Fenton of Slick Aircraft Products. It pertains to Service Bulletin SB1-89B which is designed to alert operators of single ignition engines to the importance of maintaining and inspecting their ignition system. Harry may be reached at Slick and a copy of the Service Bulletin obtained from : Slick Aircraft Products, Attn: SB 189, 530 Blackhawk Park Ave, Rockford, IL 61104. Please send a SASE.**

**P.S. > Harry is also looking for the back half of a Sonerai I canopy that was cut off their bubble and not used, or a complete Sonerai I canopy.**

## MAGNETO HINTS

I frequently get calls from homebuilders using VW engines about using Slick magnetos. Most of these calls relate to installation and troubleshooting, but many of them are on a variety of other topics as well. The following is a summary of some topics which may be of interest.

First, a lot of questions are asked about magneto selection. My recommendation is to buy the latest model 4316 magneto. There are occasional deals to be found with older, used 4016 and 4216 magnetos, but for the couple of hundred bucks saved versus the potential headaches, just buy the newer magneto. The old mags are ok, but a new magneto just takes the hassle out of getting a VW to run properly.

Another consideration is when to purchase a magneto. Building times vary, but it is a certainty that no airplane is ever finished within the builder's estimated time frame of completion. A magneto bought five years before the engine is built and run will result in a five year old magneto with no warranty and possible operational problems due to lack of use. In the worse case, AD's can accumulate and a lot of product improvements can occur while a part is lying around.

Don't buy a magneto until you are ready to run the engine! Typically, by the time the engine is run, the airframe will probably fly within a year or two, well within the 36 shelf life warranty of the magneto.

Regarding installation, keep in mind that excessive heat will shorten a magneto's service life. The magneto operating heat range is 180 to 210 F, and the electrical components will begin to break down above 225 F. The typical Sonerai installation has the magneto in a box on the firewall which provides no ventilation. A 3/4" to 1" blast tube should be directed over the top of the magneto to cool it, and there should be adequate cooling outlet to expel the hot air.

Tachometer connection is another concern. Most homebuilt tachs attach at the magneto P-lead, sensing voltage and point action to drive the tach indicator. But what if the tach shorts out? It grounds the magneto and it quits working! This was a problem with Grob motorgliders a few years ago until they put a circuit breaker in line with the tach circuit to disconnect the tach in the event of failure.

Here's another hint. When the magneto is installed, timed and finally locked down, paint a reference mark between the magneto frame and the engine case. This will provide a reference mark to gauge internal point wear and timing drift. As the points wear, the magneto must be turned slightly and readjusted to the engine. If the magneto drifts 3/16" from the original position, pull the magneto off and inspect the points (3/16"



= 10 deg. of internal timing drift). By the way, at the minimum, check your magneto to engine timing every annual or every 100 hours of operation.

Finally, I get asked a lot about the use of electronic ignition as either a backup or the sole source of ignition. Each system has its strengths and weaknesses.

The strengths of the battery powered electronic ignition or distributor are that they are simple to install, reliable, never need adjustment, and inexpensive. The drawbacks are obvious: If you lose your battery, power connection, or have a component glitch, then be prepared to log glider time.

The disadvantages to the magneto are awkward installation (at least in the Sonerai), poor spark at low RPM (below 550 RPM) makes engine idle rough, general mechanical wear, and expense. The advantages are a time proven method for ignition, self powering, and the reliability of the mechanical design. As crazy as it may seem, the mechanical nature of the magneto is its greatest asset. Electronic devices typically fail without warning, however the magneto will operate in a failing state for extended periods of time, providing ample warning of impending failure.

As homebuilders, most of us are pretty cavalier in accepting some risk in exchange for the design or cost of the components we use in building our aircraft, and we sometimes pursue a particular direction simply because it is contrary to established methods. On a single ignition VW installed in a high performance homebuilt, I feel that the magneto is the only way to go. On my personal engine, I have taken the politically correct route of installing both a magneto and an electronic ignition.

Ultimately, the choice of your ignition system should be tempered by considering the worst case scenario. The Sonerai is a great flying airplane and generally speaking, not a hard airplane to fly. But, it makes a poor glider, and is a much more hazardous vehicle for an off airport landing than something like a Pober Pixie might be. Personally, I find the "limp home" capability of dual ignition much more appealing than an off airport landing in Sonerai. This may be a grim thought, but I tend to make decisions based on what I call "Point of Impact Reasoning."

This is just a quick look at the most common questions, and each of the points that I detailed can be supported by real world stories and events. But, space and other interesting topics limit discussion here. If you run into an unusual situation or just have a general question, feel free to call me at Unison Industries, 815-965-4700.

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Fayetteville GA 30215-5103  
Phone 770.487.6532  
E-mail 71450.1603@Compuserve.Com

Sonerai Newsletter  
C/O Fred Keip  
11428 Six Mile Road  
Franksville WI 53126

Dear Fred,

Congratulations on assuming the co-editor duties. I just hope you don't totally let Ed off the hook, as I'm sure I speak for everyone in saying how much we appreciate what he's done for us. Please don't let him get away.

I recently returned from flying my Sonerai II from Atlanta to Bar Harbor, Maine and return, and wanted to pass along some thoughts.

After waiting for 4 days for good flying weather, I was impatient to get underway. As soon as the weather lifted, I quickly topped my fuel tank, but then couldn't find the little screw that holds the access door closed. I wondered if it might have fallen into the tank, but after looking with a flashlight, and feeling around with a pickup tool, finally decided no, it's just lost. So, I replaced it, and quickly departed for Anderson, SC. Well, about 8 miles from the airport, the engine started to miss. I made it to the airport, and after landing, removed the tank and found my screw. You guessed it, the screw had fallen into the fuel line, and partially blocked it. I also found that the tank had no "finger strainer" over the line. Without it, any little bit of debris can cause a

problem. Whoever built this thing saved a whopping \$5.00 by not installing one.

Made it to Washington, DC the next day, but without a transponder, the closest I could land was Manassas, VA, a \$33.00 cab ride from the Metro station. Worth it though, to visit the Smithsonian Air & Space Museum, and other attractions.

After a couple of days of sightseeing, I made it to Keene, NH, in 1 day, and then on into Bar Harbor the next. Stayed 3 days, and explored Acadia National Park, hiked Cadillac Mountain, and ate \$8.00 lobster dinners. Life is good!

The first leg of my return was marred by a badly misfiring engine just outside Auburn, ME. After 4 or 5 seconds, it started running okay again. After landing, I then noticed the voltage gauge showed zero. The stator had a direct short to ground, and was also shorting out the secondary electronic ignition. After a call to Steve Bennett at Great Plains, the decision was made to continue home minus the alternator. I have a motorcycle style secondary, with a gell-cell battery in the tail, and coils and a magnetic pickup. This still worked, but without the alternator, I couldn't use it continuously. It was still available for use in an emergency, and will work for almost an hour on the little 6 amp/hr battery.

On the next leg, on rollout after landing at Orange, MA, the aircraft made a left turn off the runway into the grass. The little 4 inch tailwheel rubber had come apart. I again called Steve Bennett, but was told it was too late to get one shipped out that night. So, I booked a motel room, and begged the lineman for a ride to said motel. Just then, a guy landed in a Great Lakes biplane, and put me onto the local EAA chapter president. In



one of those strange, but wonderful, coincidences, this small town had a Sonerai owner. A very nice Milt Gordon came to my rescue by bringing me a used tailwheel, and saving me at least a day or so. Milt, if you read this, thanks again.

After a 3 day layover in Charlottesville, VA, while Hurricane Opal passed, the rest of the trip home was a cakewalk.

The total trip was around 2,200 nm, 26.3 hours, and 20 landings. I saw some fantastic sights, met some incredible people, and had a great time. Best were the flights over the New England mountains, and the incredible fall leaf show. You really haven't seen America until you've seen it from a small airplane.

Sincerely,

Roy

### **HYDRAULIC BRAKE QUESTION**

I got the following letter from Jerry Gore of Hendersonville, North Carolina:

Hi Fred,

Noticed in a 1993 Sonerai Newsletter that you installed hydraulic brakes. Well I purchased the same set this spring and finally installed on my Sonerai IIL. Your article was very informative - the instructions I received with the brakes leave a great deal to the imagination.

I installed the brake cylinder off the toe of each rudder pedal, and when the wheel is jacked up off the pavement, my toe brake stops the wheel from spinning. However, pushing the fuselage and applying the toe brakes, the wheels just keep rolling along. Could you make any suggestions as to why this is happening?

I am using 2-1/8" thick 3/4" washers against the mounting bolts and brake caliper which prevents the caliper from moving-as you showed in the pictures.

If you have any suggestions on how I can improve brake stopping I would appreciate it.

Thanks, Jerry Gore

Well Jerry, there are three things I can think of, off the top of my head, that need to be looked at:

1. Make sure that you remove the brake disc return springs from the caliper assembly. If you don't, you have to overcome those springs before the brake starts to actuate.
2. Make sure your master cylinders are no larger than 1/2" or 5/8" diameter, or you won't be able to develop enough pressure. Remember, the smaller the diameter, the higher the pressure for a given force on the cylinder.
3. Make sure that your toe brake assembly provides enough mechanical advantage to convert your toe force into master cylinder force.

I hope this helps.

Fred

## **ONLY TEN YEARS?** by Fred Keip

It's hard for me to believe, but ten years ago this past October and November, I painted my Sonerai and moved it to the airport for the first time. Well, as fate would have it, now I get to do it all over again.

Last week (this is being written in early December) I brought the airplane home so that I could spend the winter recovering, repainting, and generally fixing her up so she looks like new again. The primary reason for doing this is that the paint job had given up the ghost and really looked like crap, and secondly there are a few improvements that I've wanted to make to make her nicer to fly.

As far as the paint problem is concerned, those of you who saw her at Oshkosh this year will attest that she looked pretty bad. The problem was not so much with color coats, but with the clear coat that I sprayed over the top. The entire finishing process was done with Stits Polytone, topped off with a Polytone Clear coat. And the clear coat on all the upper surfaces was breaking down, turning a sickly brown color.

When I asked Ray Stits about the problem a couple of years ago, he told me that they had had a lot of problems with the Polytone Clear and took it off the market. That didn't make me feel too good, but there wasn't a whole lot I could do about it except live with it as it was, try to remove it somehow, or start over. So, I lived with it for a couple of years and finally after getting sick of looking at it, have decided to

take the plunge, do it over from scratch.

This time I'm going to use the Superflite II process, which is a polyurethane finish. My hangar partner is currently using it to finish an Acroport that he and I are rebuilding (I built the new wing panels for him) and the stuff is gorgeous. Besides he's offered to shoot the paint for me. How can I refuse?

As far as the improvements that I want to make are concerned, the primary one is to install a pitch trim system. My plan is to install a cable-actuated jackscrew on the horizontal stabilizer. Al Bertelmann showed me the arrangement he built for his airplane, and I was so impressed by its simplicity, that I decided I had to put one in. Mine will be a little different, but will work on the same principle. Hopefully, I will have an article on it for the next newsletter.

So anyway, the fuselage is now in the basement, out of the winter cold. I've got the old fabric off, as well as the firewall, instrument panel, and most of the rest of the stuff. And I'm ready to spend this winter making her new again.

I'll keep you posted on the progress.



# Want Ads

Wanted -- Cont. A65 taper shaft prop hub and professionally welded fuselage for Sonerai (set up for Cont.) Also, I have Bendix mag rotors to correct the S-20 AD.  
For Sale -- Cont. A75-8 300 SMOH  
John Mc Laughlin 25839 Tallwood Dr.  
North Olmsted, OH 44070 216-734-5578

For Sale -- Suburu engine 1985 EA82 turbo engine complete with EFI, computer, turbo all access. 5 suburu repair manuals. \$1400 for all. Also, EA82 non-turbo engine TBI injection. Car ran but engine may need work. Bob Stieg 815-397-1533 days  
815-234-2283 eves.

For Sale -- VW 1835 engine. All new. Hd. lifters, SCAT heads, Hapi access case w/ dual alt., elec. ignition, prop hub installed, Zenith carb. Might separate. Apart for inspection. Can assemble.  
Bob Stieg 815-397-1533 days  
815-234-2283 eves.

For Sale -- Sonerai II midwing, Supervee cowl, Sterba prop, 2100 engine w/Revmaster prop ext. Also, 4016 Slick mag w/ 100 hrs, and misc. instruments.  
Eddie Eiland 1350 Thunderbrook  
De Soto, TX ph.214-230-8475

Wanted -- Son II mid-wing preferably 2180 GPAS. Must be quality constr. and currently flying.  
Marty Hammersmith 1777 Oakridge Dr.  
Lawrenceburg, IN 47025 ph.812-637-2122

Wanted -- Son II LTS, LS, or LT w/2180, but will consider a taildraggerw/ smaller engine. Prefer wing mod already done.  
Bud Aumann 11340 w. 38th Ave. #26  
Wheat Ridge, CO 80033 ph.303-420-6071

For Sale -- Porsche 914 2 liter engine project. Motor ran, mostly converted. 9" prop extension. Ellison carb. 650 Honda alt. Aluminum welded manifold. Potentially best VW conversion yet. Very cheap.  
Roger Durham 1370 Thompson Ave.  
Glendale, CA 91201 818-846-9163

For Sale -- 1990 Sonerai II L 2180 G.P. engine, Ellison carb, S-wing, Aux fuel tank, tinted canopy, white/red sunburst wings and tail. 250 hrs+ Actively flying. \$10,000 Call Vic at 507-282-6647

For Sale -- Sonerai I Kit, welded fuse, wing kit, cowl, canopy, gear, wheels and brakes. \$2000.00  
John Dialogue 801-571-3063

For Sale -- Sonerai II bubble canopy -- smoked brown, complete with latches, etc. \$300.00 (U.S.) 613-632-9601 home  
514-437-6129 work

For Sale -- Sonerai II midwing fuselage, nice welding, controls, tailfeathers, spar box, gas tank, seats, on gear with 6X6 Azusa wheels, \$1000 or \$1250 w/ new Slick mag and harness. Might trade for Son I parts, other airplane parts or ?  
Harry Fenton wk: 815-965-4700

For Sale -- Sonerai II midwing w/ 1700 Monnett conv. needing to be rebuilt. Aircraft partially disassembled. \$6000.  
Tom Freeman 708-526-3180

Wanted -- Sonerai II in flyable condition with trailer if possible.  
Steve 916-489-5514

For Sale -- Sonerai IIL 1700 VW, 1000 TT 100 STOH, new ICOM A21, Intercom, new interior, excellent paint, 110 mph on 3.5 gph \$8000 Runs Flys and looks great!  
Steve 605-336-7791

Wanted -- Son II project or completed aircraft. Preferred to have it 70-80% completed.  
Dave Valaer 2833 Summit St  
Souix City, IA 51104 712-277-2823

Wanted -- Variety of good used or new Sonerai parts: cowl, canopy, 5/8" landing gear, spinner, S wing kit. Also interested in a Son IIL project.  
Mike -- 219-534-2900

For Sale -- unused fuel tank for Sonerai II, intake manifold for 2180 Engine and Stub Exhaust kit for 2180  
Raymond Bergner 1310 Parker Rd.  
Lakeland, FL 33811 813-646-0953

Wanted -- Used, worn out, junk 4000 series Slick magneto. Super Vee prop hub and casting.  
Bob Schank 313-697-7057 after 5 P.M.  
35 Clarence St. Belleville, MI 48111

Wanted-- 1850 or larger long block suitable for Sonerai II Super Vee, in good working order.  
Nick Fourdraine RR # 1  
New Glasgow, N.S. Canada B2H 5C4

For Sale -- Sonerai II LT (easily conv. back to conventional gear) Wing Mod, VFR instr., Cleveland wheels and toe brakes No engine or prop.  
Ivan Haecker 8434 FM 2673  
Canyon Lake, TX 78133  
210-438-3354 weekend 210-899-4824 eve.

Wanted -- Sonerai prewelded or tacked fuselage with tail feathers. Also, landing gear kit.  
Joe Burr 4098 Eddystone Dr.  
Cincinnati, OH 45251 317-827-7195

For Sale -- Pitts S-1c 180 hp, full inverted, many features. Call for details.  
Joe Norris 715-886-3261

For Sale -- 1 Type 3 Supercase by Claudes Buggies, 1 forged crankshaft w/hub and prop extension, 2 cyl. heads w/ S.S. valves, 1 set of NPR piston rings. All for \$500.  
217-935-5345 evenings

For Sale -- 2 valve covers, 2 dual port int. man., 1 external oil cooler adapter, 1 oil cooler eliminator(bypass). All above are cast aluminum \$65.00 total. Also-- 4 exh. flanges, 2 steel "U" bends for exh. \$25.00 total. Also -- 1 dist.hole rubber plug \$5.00 Everything together \$85.00  
210-899-4824 even. or 210-438-3154 week.

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