ACRO SPORT Newsletter

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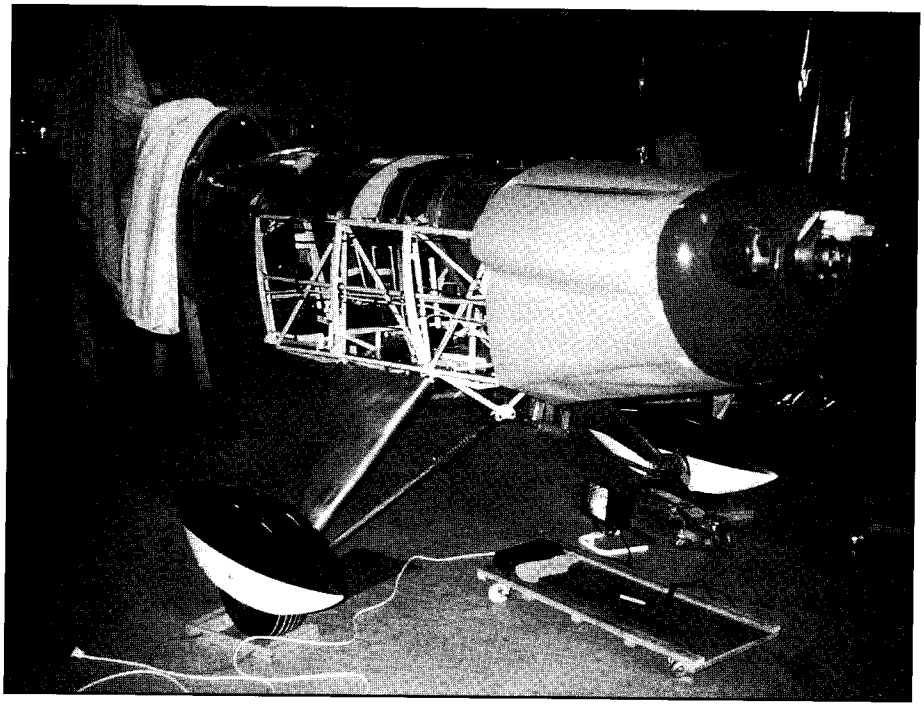
Building The Acro Sport II

Annual Update

by Dick Merkel
10087 Cemetery Road
Pecatonica, IL 61063-9012



The enclosed photos update progress on Acro Sport II, SN 1044, tail number N796DM. It seems like my progress is slow, but in reality, I'm only a whisker away from done. I must make a hole in the nose bowl to provide air to the Bendix fuel injector, install the exhaust pipes and make the windshields and their frames. Then the painting and it's ready to test and fly. I shall spend many hours taxiing and ground testing before THE DAY. My plan is to do it all from our strip — Early-Merkel Field.

The following will tell you some about my work since my January '96 update:

Covering the ailerons was great fun. Not as easy as the wings — I suppose because they are smaller. The tail surfaces also seemed reluctant to let me get the cloth on just right with proper overlap — maybe I was too particular, although I really don't think being "too particular" can be overdone in building an airplane.

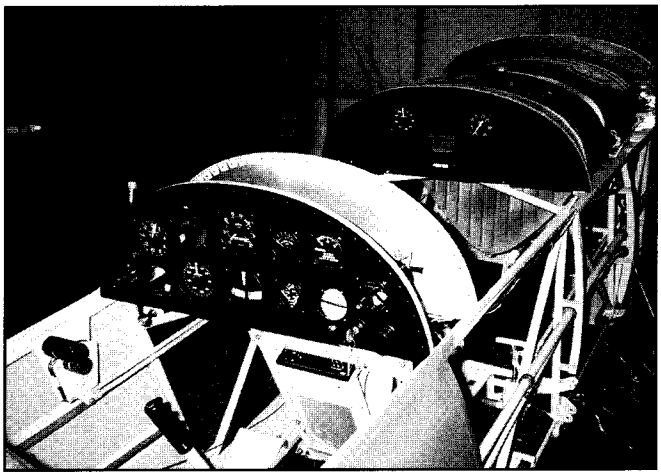
Before covering the fuselage, I built and installed the battery box and battery behind the rear seat. I have a 35RG battery so it really could do without a box except that the box provides convenient security for the battery. I made the box from 032 aluminum with a drain out the bottom. It was great until I tried to put the battery in through the back of the rear seat. It fit OK but I couldn't tip it enough to get it down into the box! So, I had to make a side door on the box abcut two inches wide and hinge it lengthwise. Now the battery slides in OK. I'm using the fuselage frame for common ground. The wire, (#2), to starter solenoid is heavy, so I wanted to minimize that weight. The rest of the wiring I also finished before covering the fuselage.

I made an electrical panel just to the right of the rear seat. It has volt/ammeter gauge, fuses, master/alternator switch and starter switch. Also, light and fuel pump switches. The main buss is under the rear seat. I put a cigar lighter on the instrument panel for an auxiliary power source.

I next finished up the instrument panels. The fuel quantity gauge, CHT and oil pressure/temperature are electric. Fuel pressure comes off the engine pump. Turn & bank is vacuum but since it is the only vacuum gauge I will remove it and go to an electric one. I have taken the vacuum pump off the engine and will eliminate the pressure gauge and the plumbing. The clock is from an F-106 as is the magnetic compass. I've suspended the mag compass from the center wing section to eliminate magnetic interference. Front and rear tachometers, altimeters and airspeeds are hooked in tandem. G-meter came from Molt Taylor a few years ago.

Kendra at Century Instruments was a great help on many instruments, especially the altimeters, (I bought two new Kollsman altimeters several years ago. They were too long when I tried to install them, so I had to get shorter ones; Kendra came through).

Once the instrument panels were in and all wiring and plumbing done, my sweet wife had a lady who does upholstery make cushions for the front and rear and cover the headrests. Hooker harness in Freeport then made harness sets to match the cushions. Oh yes, to the left of the rear seat, opposite the electrical panel, I put a small glove box. Its cover has the mic and headset jacks. Mic and headset jacks are on the instrument panel in the front cockpit.



I have a VAL VHF radio. I installed it on the back of the front seat. Mic buttons are in the stick grips. As I mentioned earlier, I put a comm antenna in the left wing tip. Just in case it doesn't work satisfactorily, I put a ground plane in the bottom of the fuselage, under the rear seat, for an alternate antenna location. An outside air temperature gauge is mounted below the radio on the floor in front of the stick in the rear cockpit.

When I'd done all I could from tail wheel to fuel tanks, I next covered the fuselage. It was not the problem I'd envisioned. I talked to Don Baker and looked at his airplane to get an idea where to put seams. I did encounter some difficulty keeping the side stringers straight while tightening the cloth. During all phases of covering, I went back and looked at Stits' video many times. It really helps. One thing I found in covering the fuselage that I'd not seen with the wings and control surfaces was — little things I thought would be clear of the cloth actually touched it when the cloth was taut. I was also very concerned about having the area look good at the aft end of the turtle deck where it joins the vertical stabilizer, but the iron made that look real nice.

I put three coats of poly spray on the control surfaces and fuselage with sanding between the first two. The silver sure covers and sands nice. Most of the pinked edges have all but disappeared.

On to the aluminum panels. I made the bottom panel, under the two cockpits first. Except around the fire wall where I used floating anchors, I used Rivnuts. Some Rivnuts I had gotten were too soft, but I soon figured that out and threw them away. Others I got from A/C Spruce were OK.

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EDITORIAL/ by Bill Berrick, Editor

An important difference in Conditioning of metallic versus organic brake linings was pointed out in a recent issue of our EAA Chapter 80 Newsletter; it is worth passing on to you whether your airplane is already flying or still in the workshop. The original reference is Parker Hannifin's COMPONENT MAINTENANCE MANUAL.

Conditioning of Metallic Linings: This conditioning procedure will wear off high spots and generate sufficient heat to glaze the linings. Once the linings are glazed, the braking system will provide many hours of maintenance-free service. Visual inspection of the brake disc will indicate the lining condition. A smooth surface, without grooves, indicates the linings are properly glazed. If the disc is rough, (grooved), the linings must be re-glazed. The conditioning procedure should be performed whenever the rough disc condition is evident. Light use, such as in taxiing, will cause the glaze to be worn rapidly. The proper conditioning procedure follows:

1. Perform two consecutive hard braking applications from 30 to 35 knots.
2. Do not allow the brake discs to cool substantially between stops.

ON AIRCRAFT WITH TAIL WHEELS, EXERCISE CAUTION DURING STOPPING TO PREVENT TAIL LIFTING.

Conditioning of Non Asbestos Organic Linings: This conditioning procedure will generate sufficient heat to cure the resins in the lining, yet will not cause the material to become carburized due to excessive heat. Once the linings are cured, the braking system will provide many hours of maintenance-free service. Conditioning may be accomplished as follows:

1. Taxi aircraft for 1500 feet with engine at 1700 rpm applying brake pedal force as needed to develop a 5 - 10 mph taxi speed.
2. Allow brakes to cool 10 - 15 minutes.
3. Apply brakes and check to see if a high throttle static run up may be held with normal pedal force...If so, conditioning is completed.
4. If static run up cannot be held, repeat steps 1 through 3 as needed to successfully hold.

This conditioning procedure will generate sufficient heat to create a thin layer of glazed material at the lining friction surface. Normal brake usage should generate enough heat to maintain the glaze throughout the life of the lining. Light brake usage can cause the glaze to wear off, resulting in reduced brake performance. In such cases, the lining may be conditioned again.

For older asbestos based organic linings: Perform a minimum of six light pedal effort braking applications from 25 to 40 mph. Allow the brake discs to partially cool between stops.

Metallic linings are of sintered metal composition attached by torque pins which fit into the back surface of the lining. The holes for the pins are not visible on the lining surface unless the lining is worn beyond its wear limit, (0.100 inch). Organic lining is identified by its semi-hard composition and rivets used to attach the lining to the pressure plate or back plate. The rivet holes are visible on the lining.

ACRO SPORT NEWSLETTER — Editor: Bill Berrick, 11803 Hunters Cove, Omaha, NE 68123

Rudi Bertocchi's Acro Sport II in Israel!

19 January 97

Dear Ben,

As you know I have been building my ACRO II, (serial number 271), since the beginning of 1980!! It took me about 3000 hours to finish it. Very few really believed that the ACRO would eventually fly and sometimes even I had my doubts. It was not easy. The ACRO broke ground in the middle of October last year, (1996). I have not completed the flight test phase yet, so I cannot provide any performance figures. All I can say is, that while landing the nose does not only obstruct the airstrip and the airfield, it obstructs the whole State of Israel!! A crash course in ballet dancing should also be mandatory before attempting to take-off or land the aircraft. I had the sense not to perform the maiden flight myself. A much more experienced pilot did that. He is now trying to teach me how to land. I am still trying to figure out where the darn airfield is during the final approach. I suppose that when I find it, landing the aircraft will be a piece of cake, unless the runway by then has sunk into the sea . . .

I'm sending you some photographs of my ACRO II for your collection.

I have prepared a Flight Manual, a Service Manual, a Maintenance Schedule and a Flight Checklist for the ACRO II as required by the local CAA. I can supply you with copies of these manuals to be distributed to the builders as **Guidelines** for the establishment of their required documentation. Let me know if you are interested.

If you want, I can write an article for Sport Aviation describing the building and the flying of the ACRO. However, you should know that I have quite a critical view of the plans, material kits and design of the airframe, which might interfere with the high spirited and optimistic style of the articles printed in Sport Aviation. There is of course no need to pay me or reimburse me in any other way. I only require that my name will be spelled correctly.

The particulars of my ACRO II, (4X-CYX) are:

Time to build: approx. 3000 hrs.

Empty weight: 477 Kg, (1050 lbs).

Engine: Textron-Lycoming O-320-A2B, (no inverted systems), with stainless steel crossover system.

Propeller: Sensenich 74DM 6-0-56.

Fabric: Stits D-103 with DuPont Centari 500 Topcoat, (with flex agent).

Nav/Com: King KX 170B.

Transponder: King KT76A with mode C.

Intercom: Sigtronics SPA-400 N.

Tailwheel: Scott 2000 with compression springs.

Leather seats with laminated Temperfoam cushion material.

Hooker 5 point restraint harness in both cockpits.

Cost: Don't want to know.

Wife: 1.

Children: 3.

I hope to hear from you soon.

Best regards,
Rudy Bertocchi
Tel: 972 9 957458
Fax: 972 9 9583543
48 Medinat Hayehudim St.
E-mail: bertoc@netvision.net.il
46766 Herzliya
Israel

P.S. Just to make you green with envy; most of November and December has been calm with the temperatures in the 70s and CAVOK!

February 4, 1997

Dear Rudy:

Thank you very much for the nice article on the ACRO II and for the very

More Acro Sports In Aerobatic Competition

The January issue of SPORT AEROBATICS listed Robert Freeman as winner of the Intermediate category at the October 1996 Sterling, CO contest in his Acro Sport II! Darrell Jelle competed in that contest with his Acro Sport II in the Sportsman class, and Judy Lavender competed in the Basic category at Tucson in her Acro Sport. Your editor saw Paul Muhle compete in the Sportsman category at Seward, NE last summer in his Grand Champion Acro Sport II, and it performed as beautifully as it looks on the ground!

Jim Piros competed in his Acro Sport I at the same contest in the Intermediate class, and Steve Johnson placed second in the Intermediate class at the September Matoon, IL contest in his Acro Sport.

beautiful photographs! Congratulations to you on completing a very nice airplane! We have sent on some of the photographs to Sport Aviation and some to the Acro Sport Newsletter.

Rudy, we would appreciate your sending on a copy of your flight manual, service manual, maintenance schedule, and checklist. I'm sure that we can use them.

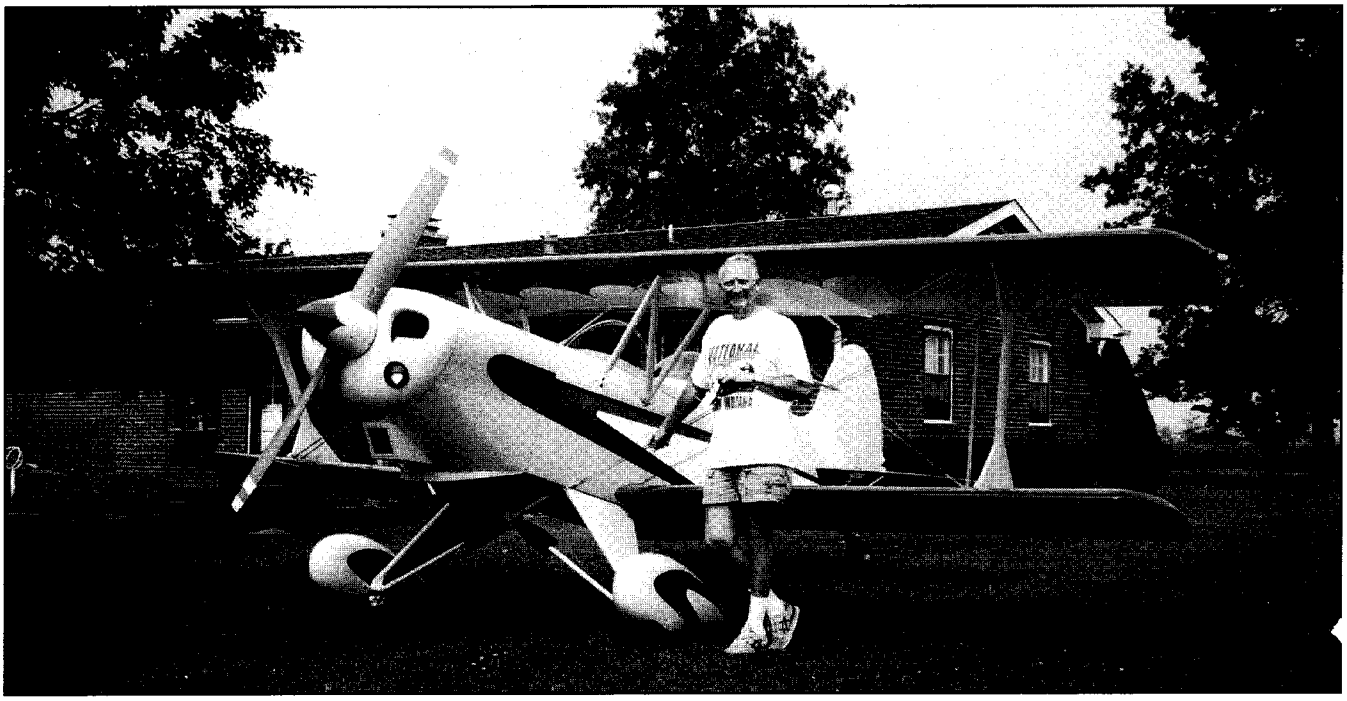
We did recently have an article in Sport Aviation on an Acro Sport II. We may not be able to use this for a while due to that, but we might consider it for the Experimenter Magazine.

If you are having a great deal of difficulty with the nose-high attitude on approach, I would try a continuously turning approach from the 90 degree position to landing. This works pretty well with long-nosed airplanes.

Thanks again for the great pictures and story!

Ben Owen, Executive Director EAA Information Services

Editors note: At the 1995 Oshkosh Forum, Don Baker and others suggested flying final at 90 mph and doing wheel landings in order to keep the runway in sight.



Dr. Richard Henry and his triumph after 15 years of effort!

February 6, 1997

Dear Ben,

Enclosed please find the photos of my Acro II which I finished in the Spring of '96. I was unable to begin flight testing in time to take it to Oshkosh this past summer. It certainly was a long term project, in that I started it over 15 years ago! I estimated I have around 3300 hours in its construction. I still at this time have not completed my flight testing phase, but find it is extremely sensitive in pitch. Having no previous tail dragging experience, learning to land it has been quite exciting, especially since I tend to over-control in the final flare. This was pretty much a plans built airplane from start to finish, I look forward to finally displaying it next summer at Oshkosh. The construction of this airplane has truly been an educational experience. It has a full electrical system and came in with an empty weight of 1108 lbs. I have an AEIO-360 engine with a 76/60 prop. I look forward to having it judged. See you in August.

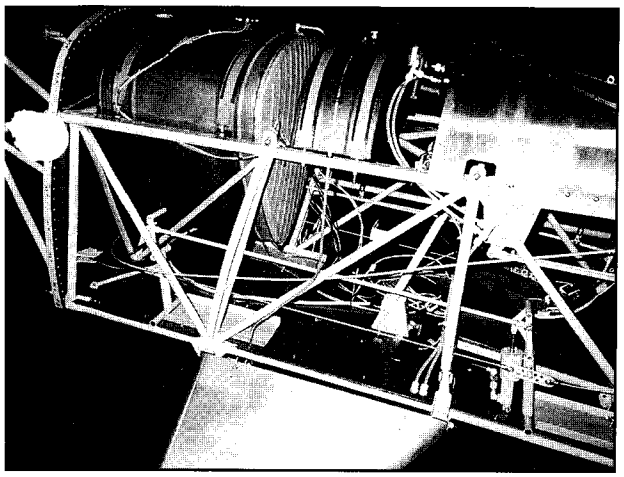
Respectfully,
Richard W. Henry, D.D.S.
651 S. Hebron Avenue
Evansville, Indiana 47714-4048

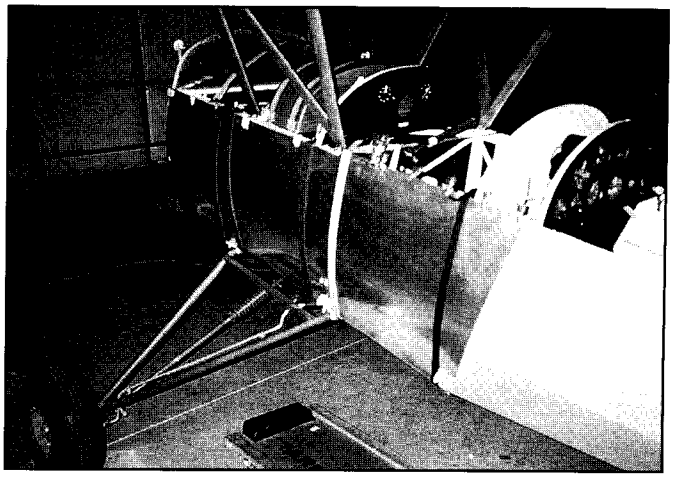
A beautiful yellow, green & white Acro II by Richard Henry.

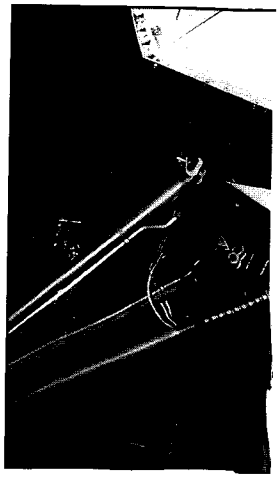
OSHKOSH '97

Wednesday July 30 thru Tuesday August 5

(See many of the aircraft you have been reading about in the Acro Sport Newsletter — talk to the builders — attend the forums — be a part of aviation's biggest event)!







Acro Sport Update... *From page 2*

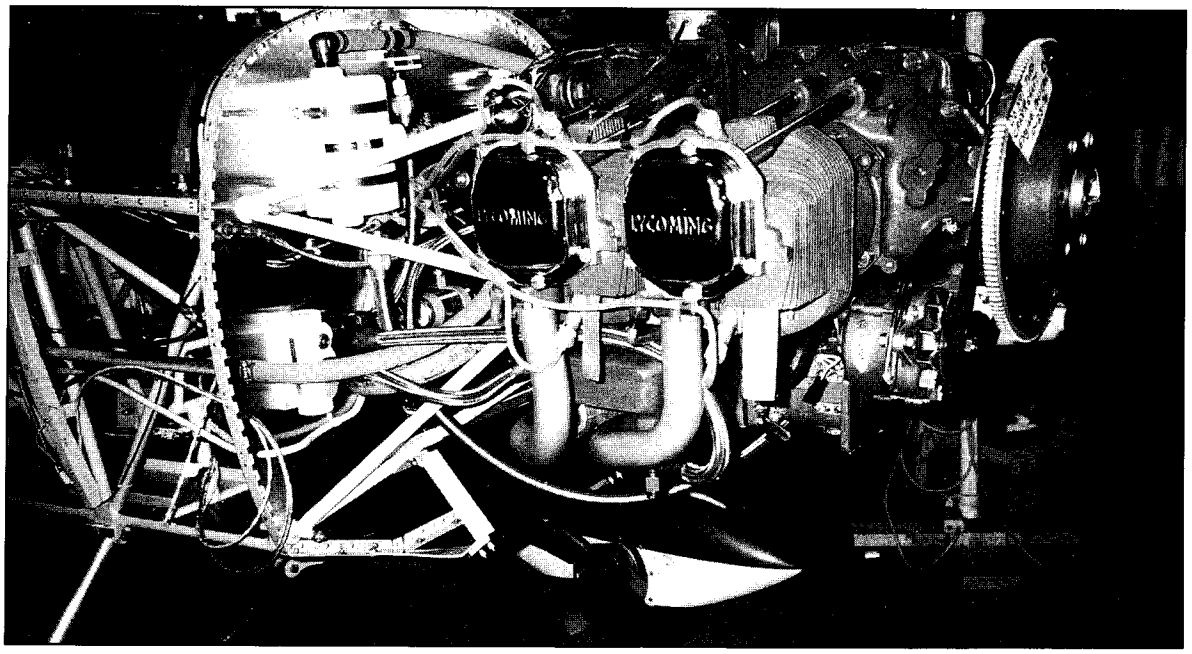
Used #8 SS screws for all panels, three inch spacing vertically and two inch horizontally. I made a pattern for each panel out of heavy brown butcher paper first. It was easy to make and remake without expending aluminum. When I then copied the patterns to 025/032 aluminum, the panels came out real good. I learned that where the panels are curved a lot, the paper pattern will usually be a little smaller, so I allowed for it and trimmed later. I only had to make one panel twice — the top front. I just couldn't get the holes for the rivnuts to line up since marking them was very difficult. Also, the doors to the fuel and smoke tank fillers are in that panel and I mis-measured on the first attempt. The side panels have air vents that snap in and out, one on each side for each cockpit. The bottom panel has drains for the pitot and static systems and an opening and chamber for the OAT probe. The smoke tank vent also comes out the bottom near the left gear leg.

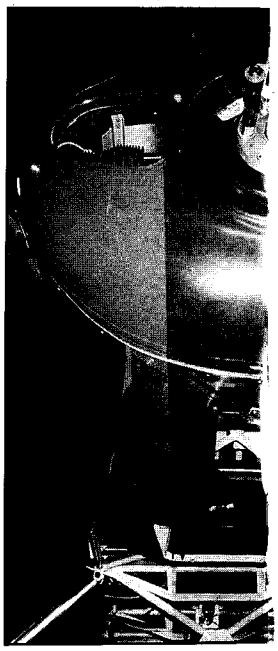
Next, I installed the fuel tank and smoke tank. These tanks from Benny Davis are just great, although the smoke tank caused me to adjust the front instrument panel 1 1/2 inches to the rear, as it is nearly too large. I put a fuel shutoff valve with control to the rear cockpit on the rear of the fire wall. The electric fuel pump, I mounted in the center of the firewall on the front side. Acquiring that pump gets your attention — with the high pressure required by fuel injection, it really costs!

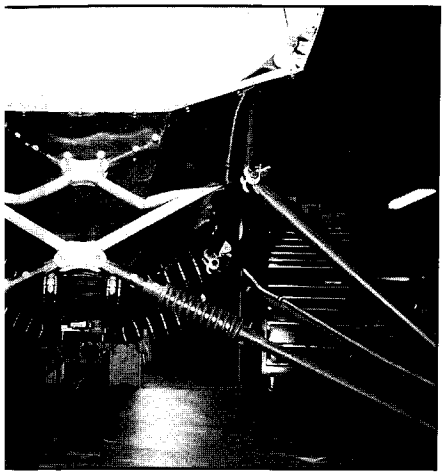
The landing gear drew next short straw. I made brackets to support the wheel pants. Solid aluminum rods, inserted inside the axles provide a threaded hole for attaching the outside of the pants. Instead of covering the gear legs with cloth, I used aluminum. Since most of my flying is off grass, I thought the aluminum might help to avoid damage cloth could suffer from foreign objects on the runway. These panels are single piece.

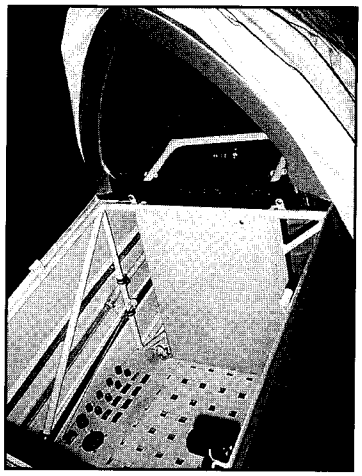
My wheels and brakes are from a Tri Pacer. The brakes are shoe type. They may be inadequate to hold the aircraft. If they don't pan out, I'll have to change them. I don't think I'll need much braking to stop as our 3000' grass strip will take care of that.

In October, I was wanting to see the engine hanging so I could begin the wiring, plumbing and cowling; so I built a fire under the guys overhauling the engine. The O-320 engine is no longer a Lycoming. We extensively modified it. Added IO-360 cylinders & pistons, new crank and all other internal parts. A Bendix fuel injector and appropriate sump make it very similar to an IO-360 but with the weight of an O-320. After the work was finished and it was assembled, we ran it for six hours on the test cell. My wildest dreams came true









when it put out something over 200 HP! With a new light weight starter and alternator, I brought it home and began installation.

So far, (except for the fabric covering which I loved), working in the engine compartment has been great fun. I had never seen a Bendix fuel injector, so that mystified me until I found someone to tell me about it. I can find nothing written to study.

My primer and carburetor heat knobs, cables and mounting which I've had about five years for the engine are OBE, (overcome by events). Hooking up everything went well — lots of contemplating — just a little work. I put in the Christen Inverted Oil system and stainless covered hoses. The oil cooler from the O-320 seemed too small so I purchased a larger one and mounted it just forward of the firewall under the engine. By the way, while waiting for the engine, I discarded my galvanized firewall and made a stainless one. It is much better although twice as heavy. I've gone through lot of bits making holes in it. Thought I'd never get all the holes made to rivet the edge around it. All the fuel lines forward of the firewall are covered with fire sleeve.

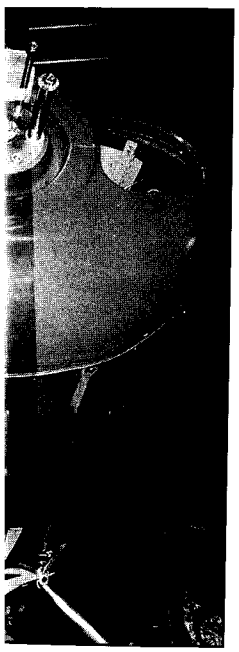
The exhaust pipes, (cross-over with muffler underneath), didn't fit once the new sump was on the engine so I decided to get the acrobatic pipes with smoke fittings from Wag Aero and forget the muffler. First though, a nose bowl was needed so I could begin the cowling. I went up to Beloit and searched Rattray's basement until he and I found one I liked and a fiberglass air scoop to go with it, (for oil cooler air). It fit great. The engine is now three inches wider than it was as an O-320, so my thinking and plans had to change to accommodate that. Making the top of the cowling and the doors was easy — used the paper pattern method and everything fit. But the bottom cowling with its entirety of compound curves had me buffaloed for several weeks. Finally I made a paper pattern — it was terrible. Then several others. Eventually I got one to fit pretty well but it seemed to always have some wrinkles. I hated to waste aluminum, but thought I might as well make a metal one to see what I had. It wasn't far off from the paper pattern but by riveting a two inch strip of aluminum to each side and a small one across the front, I had a panel I could work with. Trimmed it here and there and behold, I have a real aluminum pattern for a bottom cowl. Only enough 025 aluminum left to make one for keeps — persistence pays off!

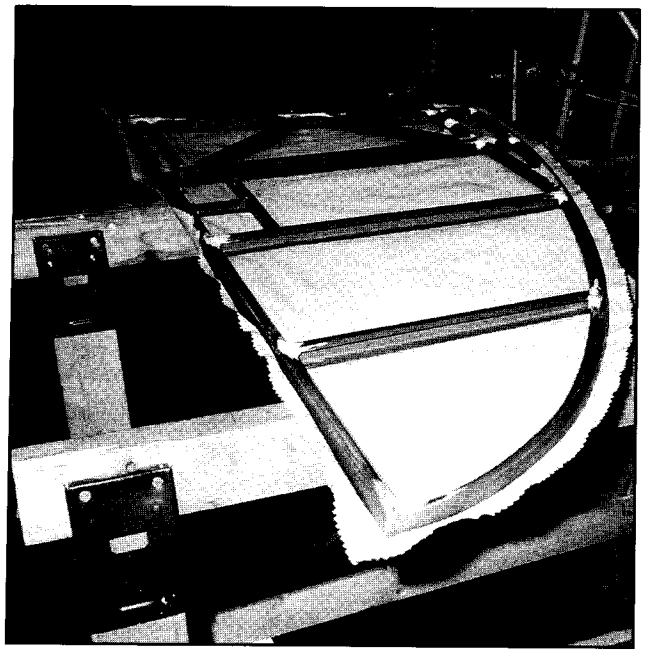
The final problem engine-wise is the exhaust pipes. I went to Wag Aero and got the ones for a Pitts. They weren't shaped quite right and interfered with the air box to the oil cooler. Then the girls at Wag found a set for an Acro Sport II. I was elated! But alas, they are 2 1/2 inches too short because of the air injector sump. I will have to modify them. That's next weeks job.

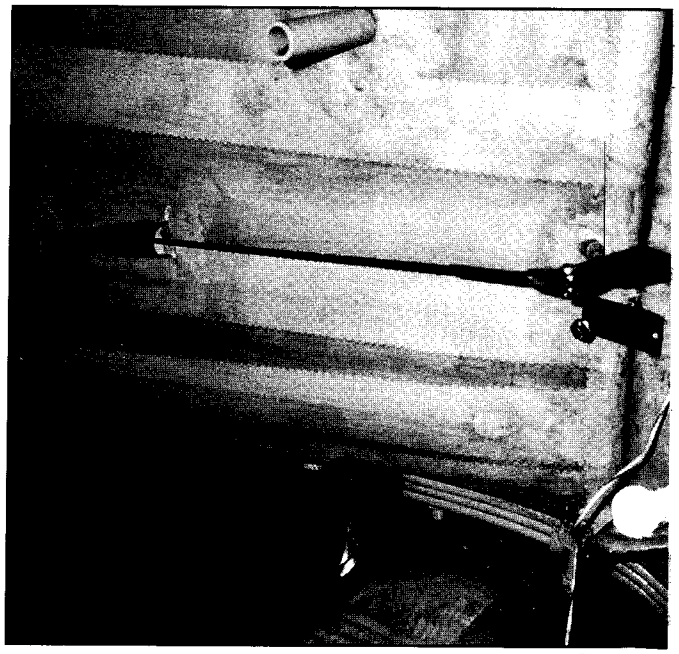
The final task, except for painting, is making the windshields and frames. Several years ago, I got while at Oshkosh, a couple of reject canopies from Dayton. I intend to cut windshields out of them for the two cockpits. The frames are another matter. I've made many out of aluminum — all bad. So my plan is to put the windshields in place and then fabricate the frames onto them out of fiberglass. Rattray gave me some hints so I'll give it a try.

The painting is all planned — scheme will be a surprise — maybe even to me! Our paint booth and Croix sprayer work great.

I received the propeller a couple of weeks ago. A wooden prop from Performance Propellers in Arizona; it is a beauty — almost too pretty to use. It's been a busy year! I hope to fly the bird N796DM in May and with any luck you may see it at Oshkosh 97.







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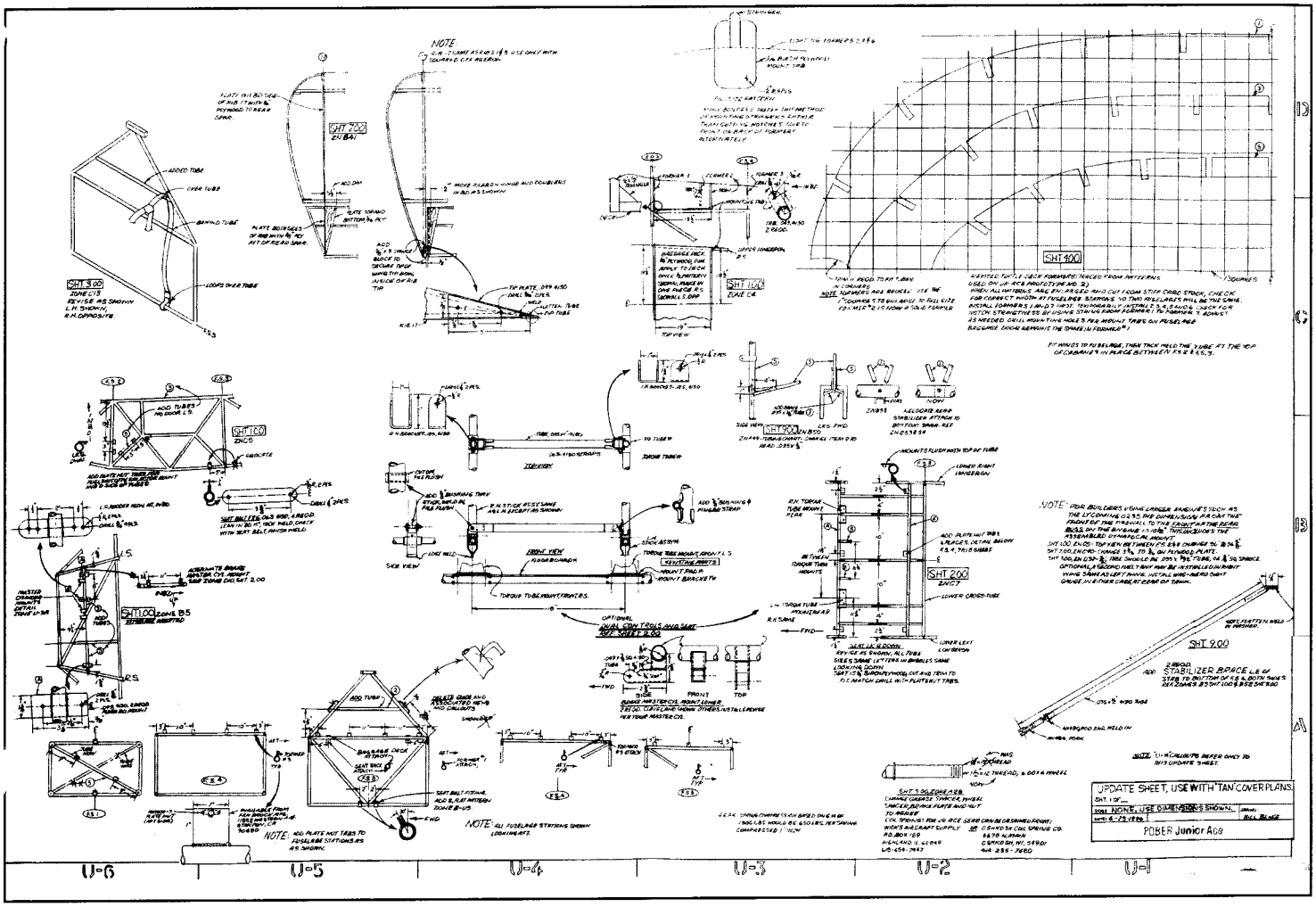


Letters To The Editor

February 14, 1997

Mr. Berrick,

I recently traded a set of 1-Design plans for a set of Acro Sport I plans with the high performance wing. I have previously built three SkyBolts and part of a Starduster II. Although I am not a beginner at aircraft building, I know very little about the Acro Sport. I am presently building a new house and I have another one to do as soon as this one is completed so I will not be starting the Acro Sport for another year. During that time I want to gather all the information I can so when the building phase starts I know what I plan on doing and, hopefully, can complete the plane in a year. I will be spending a lot of time talking to builders at Oshkosh '97 and attending the Acro Sport seminar, but until then I would like to contact any builders who might be able to furnish information, pro or con, on any of the following questions:

1) What is the difference between blue cover and yellow cover plans?

2) The use of spring gear instead of bungees or coil springs.

3) Installing a full canopy.

4) Using a liquid cooled powerplant, (Two of the SkyBolts were V-8 powered).

5) Using any engine of 200 hp or more. Weight & balance problems.

[6) Anyone flying aerobatics. Any problems with construction?

7) Building modifications that improved the plane's performance, strength or made building easier.

8) Any Newsletter issues pertaining to any of the above.

9) What editions of SPORT AVIATION have articles pertaining to any of the above?

10) Is there a list of plans revisions? I got one with the plans dated **???**

Is there an index to the Newsletters that I could use to select articles from? If not, I would volunteer to compile one and update it annually in trade for past Newsletters. I purchased the 1995 and 1996 Newsletters and am a current subscriber, but to date, there has not been a lot of information I could use on the above subjects.

I do not need any immediate answers. If you could answer any of these questions at your convenience or forward this letter to anyone who can, I would greatly appreciate it. Or, condense this down to the basic questions and put it in the "letters to the editor" column with my address. I appreciate your time.

Randy C. Echtinow
6900 Guy Road
Nashville, MI 49073
Phone 517-852-9913

Editor's Note: Newsletter #41 had an index to the first forty issues. Issue #7 has updates to plans up to that time as well as a listing of SPORT AVIATION articles. Any of you who can answer Randy's other questions please let either me or Randy know.

A HANDY ROTATING JIG

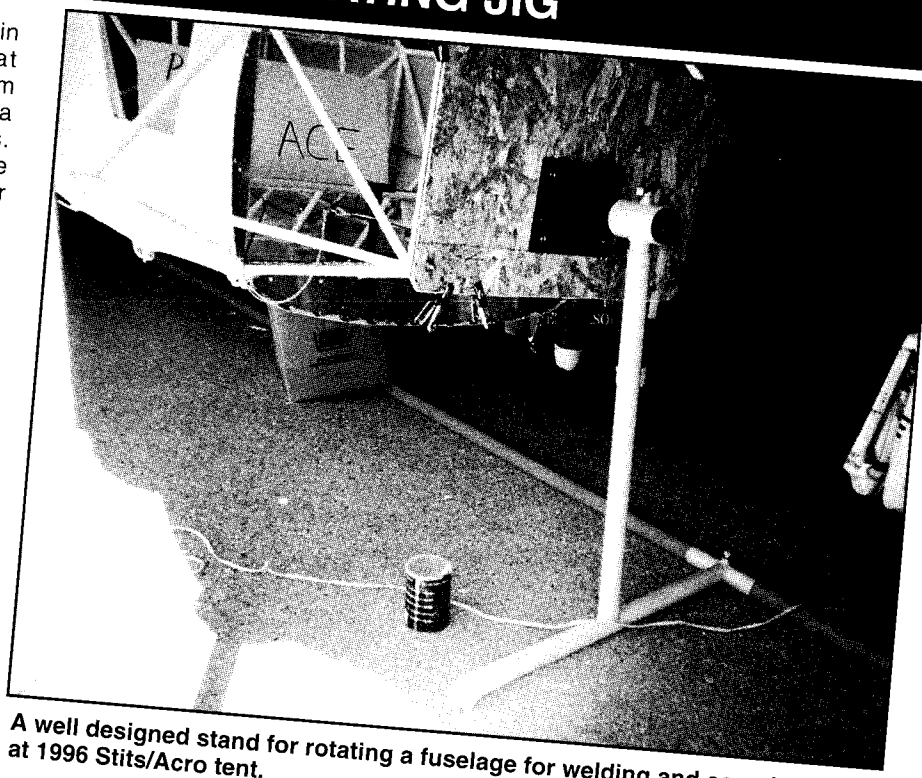
This rotating fixture was in use in the Poly Fiber/Acro Sport tent at Oshkosh '96. It could be built from scrap lying around the shop or bum a piece at a time from other builders. The welding can be done by anyone who knows how to light a torch or strike an arc.

No dimensions are given other than the 36" on the height of the fixtures and that isn't set in concrete. Individual builders will probably want to make the parts per their project and the available scrap.

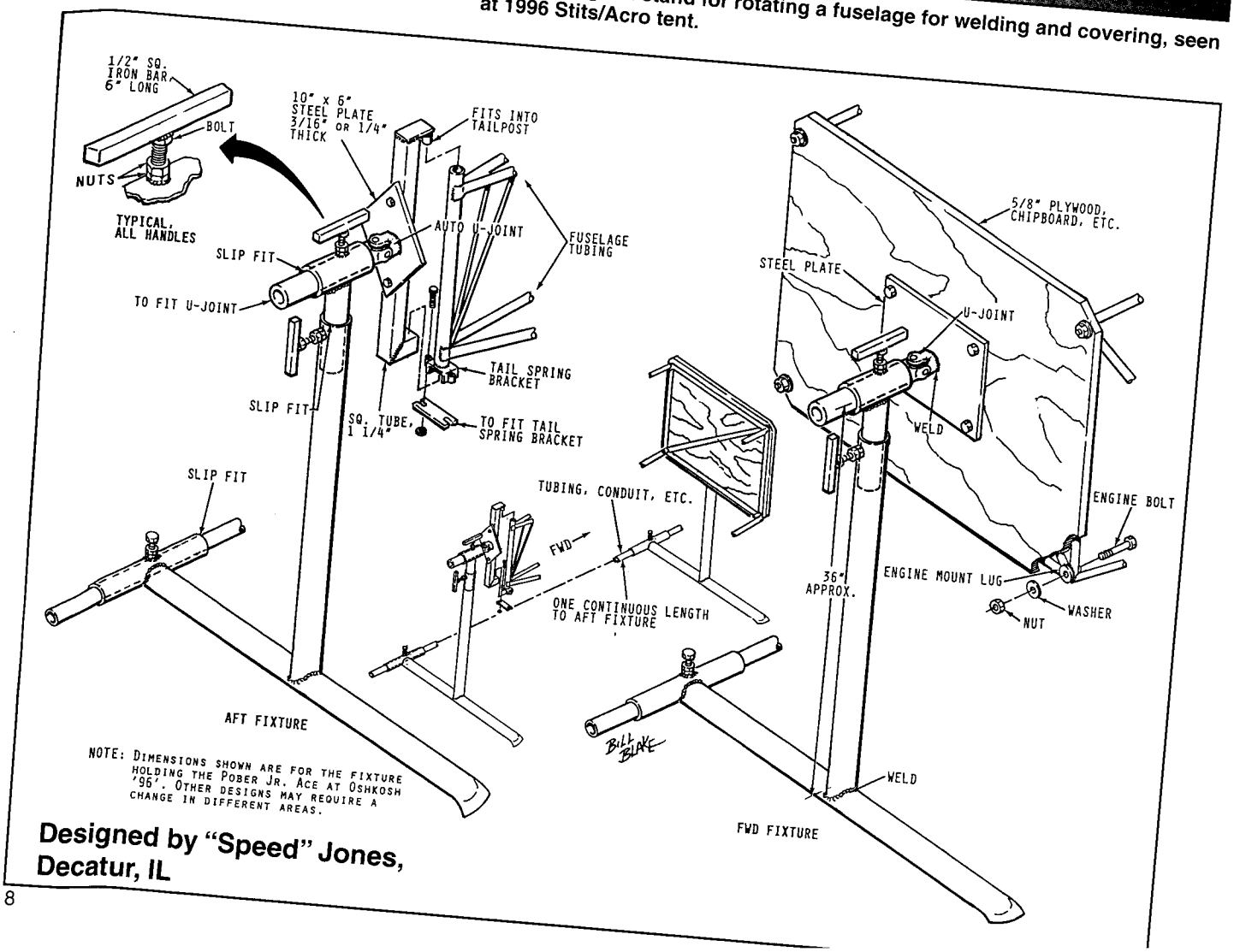
The fixture is adjustable every which way. Length, up and down, or rotate to every point on the compass and lock it in place. to make a change, just loosen a T-handle and put things where you want them, and tighten the handle again.

It seems like a real handy Chapter project to be passed around among builders.

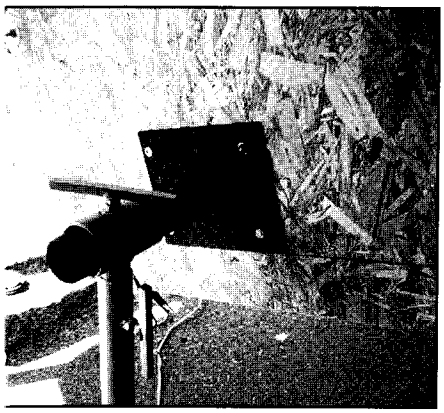
Bill Blake
57 W. Garden Walk
St. Peters, MO 63376

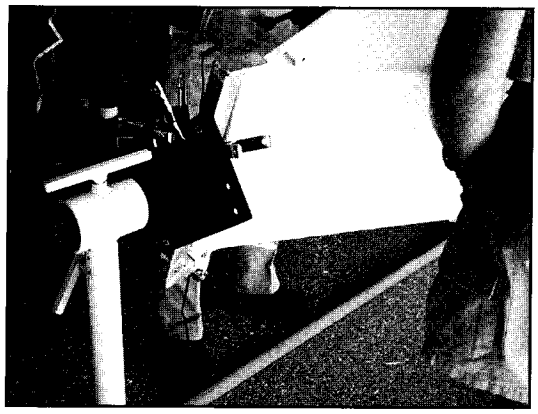


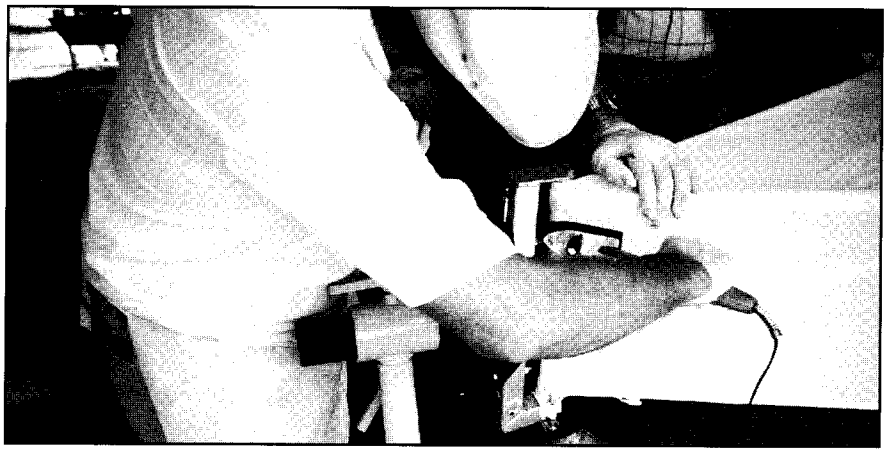
A well designed stand for rotating a fuselage for welding and covering, seen at 1996 Stits/Acro tent.



Designed by "Speed" Jones, Decatur, IL







Suppliers List for the Acro Sport I and II

by Scott Spencer

*The following list is not an endorsement for any of these companies. This list is offered simply as guide to companies known to carry both specific items and useful items for the Acro Sport I and II. There may be other companies who provide these services, however, I do not have their names, addresses, or contact numbers. Please feel free to add to this list by contacting Bill Berrick.

NOSEBOWL

Aircraft Spruce & Specialty Company
210 W. Trunslow Ave.
Fullerton, CA 92632
Order Line: 1-800-824-1930 (West Office)
Order Line: 1-800-831-2949 (East Office)

WHEEL PANTS

Aircraft Spruce & Specialty

Wag-Aero Group

PRE-FAB COMPONENTS

Ken Brock Manufacturing
11852 Western Avenue
Stanton, CA 90680
Order Line: 1-714-898-4366

Replicraft Aviation
5 Heather Way
Boonton, NJ 07005
Order Line: 1-201-402-2102

WING TIPS

Wag-Aero Group
1216 North Road
Lyons. WI 53148
Order Line: 1-800-558-6868

WIND SCREEN / CANOPY

Airplane Plastics Company
8300K Dayton Road
Fairborn, OH 45324
Order Line: 1-513-864-5607

Aircraft Spruce & Specialty

FULL SIZE DRAWINGS FOR FITTINGS

Jim Triplett
P.O. Box 407
Ames, IA 50010

AIRFRAME MATERIALS KITS

Wicks Aircraft Supply Company
P.O. Box 129
Highland, IL 62249
Orders: 1-800-221-9425

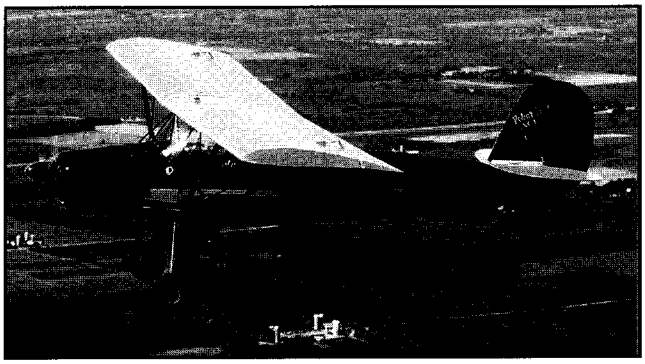
(See Advertisement left)

Oshkosh Forums and Award Dinner

Acro Sport I & II, Sunday, August 3rd, 10:00 AM to 11:15 AM with Don Baker, moderator.

Pober Pixie, Jr. & Super Ace, Monday August 4th, 10:00 AM to 11:15 AM, with John Leitus, moderator.

Acro Sport Awards Dinner will be at Robbins on Sunday, August 3rd, 6:30 cocktails, 7:00 PM dinner with awards to follow.



Next stop - Oshkosh - See the Pober Junior Ace there.

ACRO SPORT

P. O. Box 462 Hales Corners, Wisconsin 53130 414-529-2609

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SW

COMP
Neil Sidders
235 Rowland Road
Monroe, LA 71203

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